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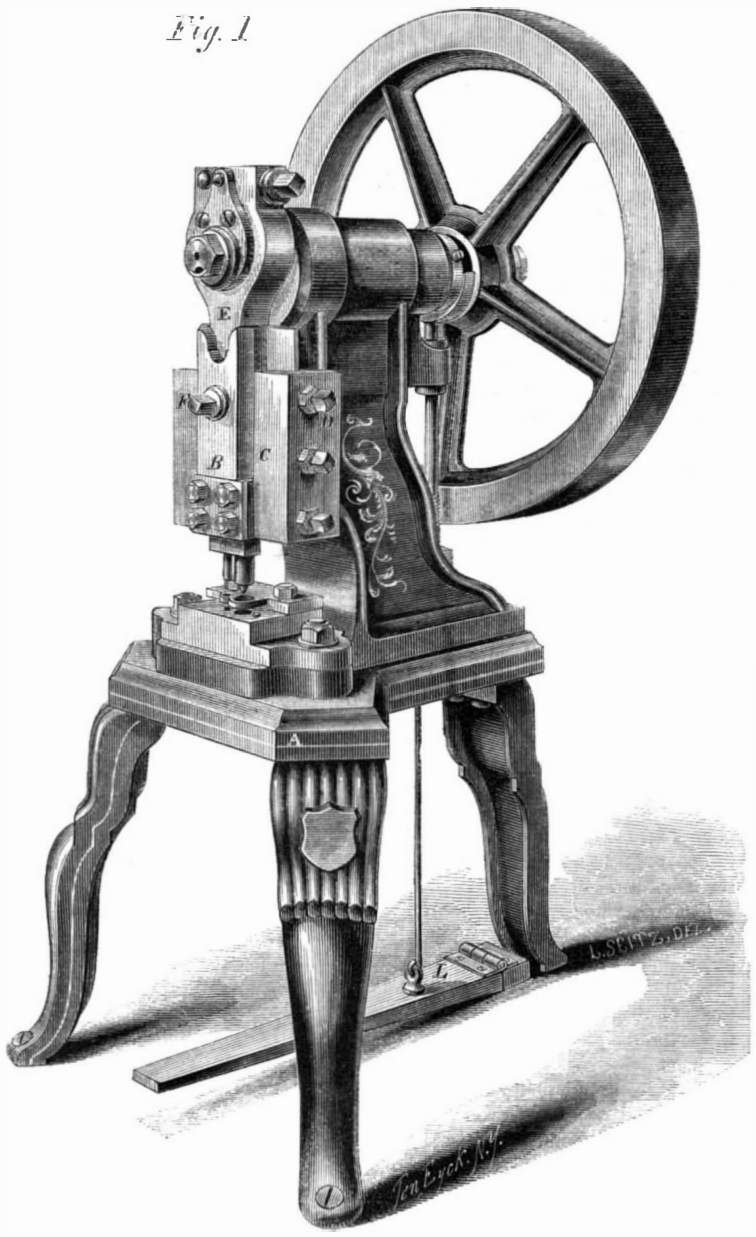
Adjustable Punching Press.

The engravings published herewith represent a new punching press which has several novel features that add very greatly to its efficiency. In appearance it is all that could be desired; and if the mechanical construction and workmanship is equal to that of the model from which this illustration is made, it is certainly superior to anything we have ever seen.

In Fig. 1 we have shown a perspective view of the press, and in Figs. 2 and 3 some of the most important details. The punching machinery is mounted on a handsome iron frame, A, which may be set in any part of the shop most convenient for it. The punches themselves are carried in a slide, B, which works between the jaws of the head, C, cast on the frame. This head is so constructed with reference to its wearing surfaces that they can all be planed without shifting the work, consequently the several faces will be perfectly parallel and true with one another. The gib which takes up the wear of the slide, B, is also peculiar; it is triangular in shape and set so that one face of the right-angle of the triangle bears against the set screws, D; in this way the screws always work against a flat surface. The connecting rod, E, which moves the slide and the punches attached to it, works on a pin at F, the head of which is squared, and has a screw thread turned on it so as to secure the pin in place; the thread extends no further than the thickness of the front part of the slide, so that the journal is entirely smooth and true. The upper end of the connecting rod is enlarged and bored out to receive an eccentric, G, shown in Fig. 2. This eccentric fits accurately in its place and is moved by the handle, H. The top of the rod, E, is cut through to the bore and fitted with a screw, I; this fixture clamps the eccentric tightly and holds it when it is adjusted at the proper point so that it will not slip. By the use of this arrangement the workman can set the stroke of the punch at any desired point for different work with great facility. The punches are driven by the shaft, J, on the end of which a crank pin is turned; this pin has a left-handed thread cut on its extreme end, and is furnished with a nut to keep the eccentric from working out when slacked off. The other end of the shaft has a wheel upon it which is driven by a belt passing around it as usual; here is, in addition, a cam, K (Fig. 3), which is worked by the treadle, I, hinged to the floor, and a collar, M, which is fastened to the shaft by set screws. These latter details, with some others, constitute what the inventor calls "a touch-off motion," the object of it being to arrest the operation of the punch and cause it to cease its motion at will. The punches always stop when the crank is at its highest elevation, thus rendering accidents to the hands of the workman impossible; many a mechanic mourns the loss of fingers from the punch making one or two strokes after it should have stopped. This often occurs even when the belt is thrown off, for the machine generally continues to work from the momentum of the fly-wheel.

Fig. 1



STILES'S ADJUSTABLE PUNCHING PRESS.

The touch-off motion is arranged as shown in Fig. 3. The clutch pin, N, is fitted so as to fill the hole it plays in snugly and yet work easily; one end of this key, so we may call it, is turned true, and has a spiral spring slipped over it, the use of which will be explained hereafter. By examining the clutch pin in Fig. 3, the reader will see that the foremost end is reduced in size, and that it has a beveled shoulder at *a*; this shoulder serves to throw the pin, or key, out of connection with the driving-wheel and constitutes the touch-off motion spoken of; for when the shaft revolves the pin must be in connection with the fly or driving-wheel, and it continues to operate the punch so long as the workman keeps his foot on the treadle below; when he releases the pressure upon this, however, the spring on the treadle-rod throws the cam, K, up, as shown in Fig. 3. When this occurs, the shoulder on the clutch pin, or key, strikes

Fig. 3

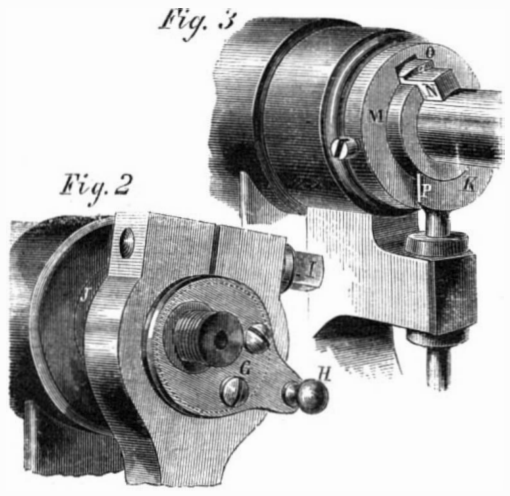


Fig. 2

on the wedge-shaped part, P, of the cam, and quickly throws the key out of the wheel, leaving the same to revolve freely on the shaft; the other edge of the cam, not seen, is rounded off, so that if the wheel is moved in the wrong direction no injury can occur to the several parts just described. The relation of the punch and the pin, or key, is such that the slide always stops when at the highest point of its stroke, as we before remarked; by bearing on the treadle the cam is withdrawn and the spiral spring mentioned previously throws the key into the driving-wheel as soon as the slot comes opposite to it.

From the arrangement of the parts just described, a punching press is produced which can be adjusted to suit any kind of work in short time. The attachment of the treadle and touch-off motion is also a valuable addition, as it is not only a safeguard against injury to the mechanic, but furnishes a ready method of controlling the action of the machine, either stopping or starting it, as occasion may require, without the workman leaving his job for a moment.

This press was patented on the 26th of Jan., 1864, through the Scientific American Patent Agency, by N. C. Stiles, of West Meriden, Conn. Further information can be had by addressing him at that place.

Cheap Mode of Feeding Horses.

J. Fisk, of Baldwinsville, N. Y., writes to the *Rural New Yorker* that he has a horse, five years old, used as a family carriage horse, which is frequently let to his neighbors. His labor is considerable. In the morning he feeds a bushel basket of cut oat straw; moistens it with water; throws in four quarts of shorts, mixes thoroughly and feeds. At noon gives straw again, and two or four quarts of shorts clear. At night mixes hay and straw—equal parts of each—cuts a basketful and mixes shorts again as in the morning. Feeds also all the potato and apple parings, cabbage leaves, &c., to him. His horse is free from cough, lively, healthy and fat; and this practice he is confident saves him 50 per cent. the cost of keeping a horse the usual way—costs about three minutes' time per day. This is an important item in the days of high feed.

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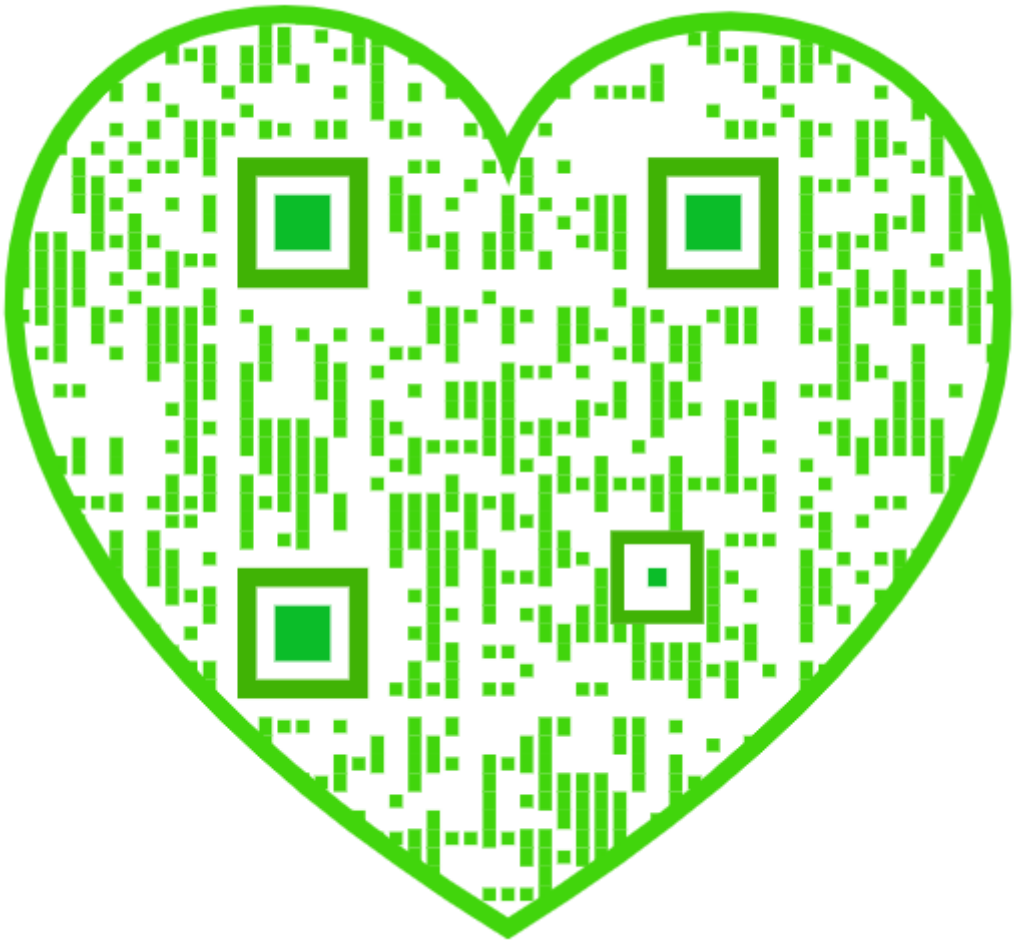

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

The law requiring the Commissioner of Patents to communicate to Congress an annual report, contemplates that in addition to statistical statements and tables, such as have been above given, he should present his reflections upon the working of the laws he is called upon to administer, and exhibit a view of the progress of the arts of the country, which it is his peculiar privilege to observe. In discharging this duty, I shall take the liberty of departing from the formality of a mere official communication, and address myself through Congress, by whose munificence the reports of this office are so widely disseminated, to the public, for whose benefit they are mainly intended.

The subjects to which I shall call attention are, the policy of any system of protection by patents; the advantages of our own system as compared with those of other leading industrial nations, and particularly Great Britain; the state of the industrial arts in this country as exhibited by the inventions examined in this office within the last one or two years; and the modifications of patent laws which in my judgment, would give greater efficiency to our patent system.

POLICY OF PROTECTION BY PATENTS.

I am aware that to most inventors in this country it would seem not less preposterous to question the right of property, or the fundamental laws of morality, than to inquire into the right and policy of granting patents for inventions; but we cannot shut our eyes to the fact that within the last few years the policy of patent laws has been the subject of grave discussion in Europe. No later than 1862, a distinguished member of the House of Commons, in England, gave notice of a motion to consider, not the working, but the policy, of the patent law itself; and in a debate which arose in May, 1862, upon a motion of Sir Hugh Cairnes for an address to the crown, praying for the appointment of a commission to inquire into the working of the law relating to patents for inventions, members of Parliament stated that year by year the opinion had grown more general that, practically, patents did more harm than good to inventors. In 1852 a select committee of the House of Lords was appointed to consider a bill proposed to amend the then existing law of patents. The voluminous evidence taken before this committee has been published, and is full of instruction as to the working of the patent laws in Great Britain, and the questions which arose as to the policy of those laws. The character of the questions which were raised as to the policy of any patent system is exhibited by some of the interrogatories proposed by the committee:—

"Do you not think that the fact of a patent being granted is a considerable obstruction to anybody else inventing in that line?"

"You think that in no case where a useful improvement in the course of a manufacture suggests itself to the mind of a man, he would be deterred from making that improvement for fear of being dragged into litigation by reason of his infringing some other patent?"

"Do not you think that the stimulus which a patent gives to a man withdraws a great many ingenious artisans from their usual and more useful work in order to invent things which, when invented, are of no use whatever?"

A question put to Mr. Brunel, an engineer of acknowledged eminence, is: "The result of your evidence is, that you are very decidedly of opinion that the whole patent system should be abolished?"

His answer is: "Yes; I think it would be an immense benefit to that unfortunate class of men whom we call inventors, who are at present ruined and their families ruined, and who I believe are a great injury to society."

"And you think that those consequences, such as ruin to inventors, and evils of that description, would subsist equally, though the patent laws were made simple and effective?"

"Yes, I think they would be very much increased; and if patents are continued, I hope the principle will be carried out thoroughly, and then it will not stand for two years."

"I can see every day that the poorer class of inventors ruin themselves by the attempt to work out some idea for the sake of getting a patent, while in all probability, if the man had gone to his master and said: 'Well, it strikes me, that by such a means we should be able to get through more work and do something better; what do you think about it?' the chances are that most masters would, if they saw it was a good idea, give the man £1 or a £5 note; and the man the next day would be at work at something else, and you would have out of that man's brains an immensely greater portion of invention, and I believe he would get much better paid for it. I believe he would really make money; whereas, now, everybody acquainted with these men knows that they lose money by it, and that an inventor, a schemer, is a poor man, who is more likely to go to the work-house than anything else."

Mr. J. L. Ricardo, a member of the House of Commons, in his answer to the questions of the committee, forced the free-trade doctrines of his eminent name-sake to the utmost verge.

He says: "The result of my experience and observation has been a conviction that the whole system of granting patents at all is very injurious to the community generally, and certainly not of any advantage whatever to the inventor. I consider that it is in a great measure a delusion upon the inventor to suppose that the patent privileges which are granted to him render his invention more valuable than it would be, supposing there did not exist any monopoly with regard to it." He regards a monopoly with respect to a particular trade as being in exactly the same situation as a monopoly respecting any particular invention. "The object of a patent is to monopolize a particular trade." He quotes Mr. Say, who considers a patent as a recompense which the Government grants to the inventor at the expense of the consumer. He quotes the opinion of Lord Kenyon, in the case of Hornblower against Bolton, in which he says: "I confess I am not one of those who greatly favor patents; for although in many instances, and particularly in this, the public are greatly favored by them; yet, on striking the balance on the subject, I think that great oppression is practiced on inferior mechanics by those who are more opulent." He does not refer to the views of Lord Mansfield, the great founder of commercial law, who held that "in all work of the mind and of genius, the common law of England ought to be held as giving an absolute property." He refers to Lord Bacon, who in his advice to Sir George Villiers, says: "Especial care must be taken that monopolies, which are the canker of all trading, be not admitted under the specious pretext of public good." But he makes no mention of the tribute to inventive genius which Lord Bacon proposes in his "Atlantis," where he says: "Upon every invention of value we erect a statue to the inventor, and give him a liberal and honorable reward."

The objectors to the policy of a system of protection by patents, as appears by the questions propounded by the committee of the House of Lords, and the answers above quoted, may be resolved into three classes:

1. Those who honestly doubt whether the system of patents affects the assumed development of the industrial resources of the nation; 2, those who believe that the progress of a nation is to be secured only through the encouragement and instrumentality of the favored classes; and, 3, those who, carrying the abstract principles of free trade to too great a generalization, deny the policy of any law which savors of a monopoly, or effects even a temporary protection of industry or genius. The objections of the first class I will hereafter attempt to answer in detail. Those of the second class not openly favored under the present political condition of affairs in this country, have found sympathy with a class now, happily, perhaps, removed from us, who always regarded with contempt the poor inventors of the North. It is this spirit which breathes in the language of the eminent engineer, who conceives that the poor inventor would be sufficiently rewarded by receiving a one-pound or five-pound note from his master. It is unnecessary to reply seriously to this class of objectors. They can be found only in a country where the avowed objects of the laws which regulate the descent of property are the concentration of wealth in the hands of the few, and the support of hereditary aristocracy; where the husbandmen on small properties have been driven from the land, in order that 2,000 proprietors may possess among them one-third of the land and the total revenue of the three kingdoms; where the doctrines of political economy prevail that large farms, large machine shops, large cotton mills, and large iron works, can produce cheaper than small ones, and therefore very properly supersede and obliterate them; and where a theologian no less respected than Dr. Chalmers can be found to affirm the blessings of a splendid aristocracy, "that from this higher galaxy of rank and fortune there are droppings, as it were, of a bland and benign influence on the general platform of humanity."

There is, unfortunately, in this country more sympathy with the last class of objectors, who regard, with Mr. Ricardo, a patent obnoxious as a remnant of the old abuse of monopolies, by which an individual obtained from the Crown the exclusive right to exercise some particular trade, and who consider the patent laws as a product of the semi-barbarous age of Queen Elizabeth. During her reign the sole right to buy and provide steel within her realm was granted to a single nobleman. The sale of salt, starch, leather, paper, &c., was restricted to favored persons, who in some cases raised the prices to 1,000 per cent. and upwards. It was this class of monopolies against which Lord Bacon inveighed. The evils of this policy increased to such an extent, that it was considered by the Parliament of James I. altogether incompatible with the prosperity of the country. This feeling produced, in the 21st of James I., the famous "statute of monopolies"—famous not only for the abolition of the former unjust monopolies of trade, but for establishing the rights of inventors, which date, according to Blackstone and other English jurists, from that law. The statute suppresses monopolies by making void the future grants of all such as do not come under the following proviso: "Provided also, and be it enacted, that any declaration before mentioned shall not extend to any Letters Patent and grants of privileges for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufacture within the realm, to the true and first inventor or inventors of such manufacture, which others at the time of making such Letters Patent shall not use, so as also they be not contrary to law, nor mischievous to the State, by raising the prices of commodities at home, or hurtful of trade or generally inconvenient." Certain patents, more of the character of the old monopolies of trading, which paid a yearly rent to the exchequer, were exempted from the operation of the statute. The date of the act was 1624. In 1639, great discontent having arisen in the public mind with respect to the monopolies and privileges which remained, there was issued a proclamation abolishing a great many of the privileges which still existed, and among others "all patents for new inventions not put in practice from the date of their respective grants." There was thus in the general statute abolishing monopolies, and the subsequent proclamation clearing away such as subsisted, a distinct recognition of the claims of useful inventions to exemption.

It is a curious fact in the general history of the origin of the patent policy, that the original object in granting patent privileges in France, as stated by M. Wolowski, professor of commercial legislation, in the evidence before the committee of the House of Lords, was to break up the monopoly of the guilds of trade which formerly existed in France, as well as in almost every city in Europe. All the persons practicing any one art or trade in a particular city, such as the tailors, the brewers, the tanners, the goldsmiths, &c., were united into a company, which received from the Government the exclusive right to practice their vocation. The competition of the art or trade was thus restricted to those who had been made free of the company; and no person could be made free until he had complied with regulations, often intentionally made numerous and vexatious in order to prevent too many persons entering the business. No member of the guild could work except in conformity with its rules. An inventor of any improvement in the trades practiced by the guild, not a member thereof, could not employ his own invention; a patent gave the inventor the right of working individually, in derogation of the chartered monopoly of the guild. According to M. Wolowski, patents are now granted in Austria for the same object. Thus the dawn of the rights of inventors has been actually coeval with the destruction of monopolies, odious to the common

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justice of men. And the common sense of mankind has marked a distinction between such monopolies and the exclusive rights conceded to inventors. Their rights under patents are called monopolies only from the poverty of language, which has failed to express in words a distinction which no less clearly exists. The odious monopolies, or those properly so called, such as were given in the time of Elizabeth, for the sale of salt, starch, paper, steel, &c., were grants simply to aid individuals in amassing wealth, and favored the aggregation of property in a few hands without opening new sources of national wealth, and were thus in derogation of the rights of others without compensatory public benefit, and were therefore positively injurious. Prof. Bowen has shown, in opposition to dogmas of Adam Smith, that individual and national wealth are not identical; that individuals grow rich by the acquisition of wealth previously existing; nations, by the creation of wealth that did not previously exist. "Invention," says Mr. Ray, according to Prof. Bowen, "is the only power on earth that can be said to create. It enters as an essential element into the process of the increase of national wealth, because that process is a creation, and not an acquisition. It does not necessarily enter into the process of the increase of individual wealth, because that may be simply an acquisition, not a creation." "Hence," continues Mr. Bowen, "the most frequent cause of the increase of national wealth is the increase of the skill, dexterity and judgment, and of the mechanical contrivances, with which national labor is applied." In this view, how can a monopoly of a trade be compared with the exclusive right in an invention? How can the exclusive privilege to sell salt in Elizabeth's time, which added not one bushel to the production, but which enriched the monopolist and robbed the community, as was the fact, by raising the price from sixteen pence a bushel to fifteen shillings, and the exclusive right of Whitney to his invention of the cotton gin, which has added hundreds of millions to the products and exports of the country, be both branded, with equal justice, with the odious name of monopoly?

The argument of the distinguished member of Parliament, Mr. Ricardo, against patents, on the ground of their being monopolies, may have less weight when the immediate practical grounds of his objections are considered. It appears from his evidence before the committee that he was chairman of the Electric Telegraph Company—the great company which, under Mr. Wheatstone's patents and a charter from Parliament, exclusively controlled the system of telegraphic communication in England.

In appears that the company paid for the patent rights under Mr. Wheatstone the sum of £140,000, and that the company had paid nearly £200,000 in buying patents and litigating them; that the company had bought up a very large number of patents which interfered with their exclusive rights, because they had made it a rule, if a man offered reasonable terms, to buy an invention, however bad it might be, sooner than litigate it; and that they paid for one patent—that of Mr. Bains—£8,000 or £9,000, which, although it did not quite come up to the expectation of the company, they found useful in combination with other patents. The obvious question occurs, how, but for the existence of the patent laws which recognized the rights of the company to the exclusive use of Mr. Wheatstone's and Mr. Bains's patent, for which they had paid the inventor a full equivalent, could they have had the means of reimbursing themselves for the vast expenditure for the original and competing patents? What more instructive illustration could be found, except the whole free-trade policy of Great Britain, of the fallacy of political economy founded simply upon the individual interests of men and nations?

It is gratifying to observe that Mr. J. S. Mill, admitted to be the ablest living writer upon political economy, and a strong advocate of free trade, thus frankly admits the reasonableness of granting patent rights: "The condemnation of monopolies," he says, ought not to extend to patents, by which the originator of a new process is permitted to enjoy, for a limited period, the exclusive privilege of using his own improvement. This is not making the commodity dearer for his benefit, but merely postponing a part of the increased cheapness which the public owe to the inventor, in order to compensate and reward him for the service. That he ought to be both compensated and rewarded for it, will not be denied; and also, that if all were at once allowed to avail themselves of his ingenuity, without having shared the labors or the expenses which he had to incur in bringing his idea into a practical shape, either such expenses and labors would be undergone by nobody, except by very opulent and very public-spirited persons, or the state must put a value on the service rendered by the inventor, and make him a public grant. This has been done in some instances (as when Parliament offered a reward of £20,000 for a method of finding a ship's longitude at sea), and may be done without inconvenience, in cases of very conspicuous public benefit; but, in general, an exclusive privilege of temporary duration is preferable, because it leaves nothing to any one's discretion; because the reward conferred by it depends upon the inventions being found useful, and the greater the usefulness the greater the reward; and because it is paid by the very persons to whom the service is rendered, the consumers of the commodity."—Political Economy, vol. II., page 497.

[We shall continue these extracts until we complete the full report.

Cleansing Wheat.

About the year 1846 a Mr. Bantz invented and patented a process for "unbranning" and cleansing wheat. The object of the process, with its later improvements, is to remove from the grain of wheat, before grinding, the outer innutritious cuticle, and to leave only the nutritious part of the grain to be ground up. The process is based on a close scientific analysis of the structure of the wheat kernel, and takes off merely the thin outer layer or hull, leaving intact the layer immediately within, which is found to be rich in nutritious substance. The kernel of wheat subjected to this process comes out whole, clean, and of light color. It has lost its whole exterior coating, excepting in the deep crease which marks one side of it, and is freed from every impurity.

Besides the diminished liability to injury by heat or insects, in wheat thus prepared, a very remarkable gain is made in its usefulness. In the old process of grinding up the grain whole and separating the bran by bolting, a part of the good flour is carried off with the bran. A part of the grain which the chemist pronounces the most valuable, but which cannot be separated from the worthless hull by grinding, is lost. Bantz's process, however, removing the worthless part and that alone, leaves the whole of the rest of the grain for use and leaves it in a state, too, which greatly improves the quality of the bread made from it. The economical results of this improvement are remarkable. The matter is touched upon in the report of Mr. Tremenheere, who was appointed in England to investigate the grievances of the journeymen bakers, and reported in 1862. Mr. Tremenheere gives the statement made by the Messrs. Hadley, of the London City Flour Mills, who had experimented with Bantz's process. We make the following extract from their evidence:—

"By the ordinary mode of grinding the result obtained is 76 per cent. of flour for human use. By the new process we find, by a series of very careful experiments, extending over several months, that we obtain about 86 per cent. of the berry available to make bread. The money value of this increase of 10 per cent. is subject to a deduction of about one-half in consideration of the lessened quantity of offal, the value of which we may take at half of that of the flour, if used as human food. The offal is used for many purposes, which give it a value larger than would at first sight be conjectured. In addition to this net increase of 5 per cent. in value of flour available for human food, the flour made by this process, containing all the nitrogenous or nutritious matter existing in the portion of the berry hitherto lost, yields a large increase in the number of loaves per sack. From the trials which we have ourselves made, we are satisfied that that increase may be safely stated at 20 lbs. of bread per sack of flour. This, taking the common yield of a sack of flour at 90 4-lb. loaves, or 360 lbs. of bread, amounts to an increase of upward of 5 per cent. on the bread (18 lbs. would be exactly 5 per cent). The aggregate gain in flour and bread may therefore safely be stated at 10 per cent. There is another source of gain in a national point of view, in the increased nutritive value of the whole mass of the flour made by this process."

A company is now being organized in Boston for the purpose of using this process.

FOREIGN INTELLIGENCE.

NEW USES OF IODINE.—From the specifications recently issued, of a patent by Professor Hofmann, of London, we learn that a new coloring matter, which dyes silk and wool of a beautiful violet, blue violet, or red violet tint, has been produced by the application of iodine extracted from sea-weed. It has long been thought that if iodine could be used as a coloring substance it would be one of the most powerful known. The patented process consists of mixing in certain proportion the substance called rosaniline with the iodides of ethyl, methyl, or amyl. This dye may be used in the same manner as the aniline colors, and is already in the hands of practical people in all the manufacturing districts, and bids fair to be "the color" of the season. The use of iodine as a disinfector has also been noticed by Dr. Richardson, who states that iodine, placed in a small box with a perforated lid, is a good means of destroying organic poison in rooms. During the late epidemic of smallpox in London he has seen the method used with benefit.

A YEAR'S LABOR DEFEATED BY THE BREAKING OF A BAR OF IRON.—An unfortunate accident has just occurred in the studio of M. Dubray, statuary, at Passy. That artist has just terminated, after a year's labor, the model of an equestrian figure of Napoleon I., destined for the city of Rouen. The committee charged to report on the work had willingly accepted the statue, being satisfied that a sculptor had never been more successful. The Prefect of the Seine-Inferieure, attracted by the report of the committee, called on the artist to see the work, and the statue was being turned on its axis to exhibit it from different points of view, when the bar of iron by which the whole mass was supported suddenly broke in two, and the work was precipitated to the ground, rider and horse being reduced to a thousand pieces. It is impossible to depict the consternation of all present, but after the first emotion was passed, M. Dubray announced that he should commence that very day on the work of preparing a new model.

THE drains of Paris are declared to be the most wonderful work of the kind ever executed. Hundreds of hollow tubes, each one a marvel of solidity and skill, run from every quarter of the town to one immense receptacle of the filth and waste water thus carried off. Before the mouth of this hideous reservoir is placed a grating through which the mass of infection pours night and day. This grating is meant to prevent the passage of any object beyond a certain size, which might otherwise obstruct the tube. The police reports of the past year record the detection of more than ten thousand new born infants thrown at the moment of birth into the drains, which had carried them to the horrid grating, there to leave them to be gathered as the most damning evidence of neglect and abandonment.

A SUBMARINE boat propelled by compressed air has been built at Rochelle, France. It is intended to pierce an enemy's vessel under water, leave a combustible shell on her side, and then to discharge it by means of electricity as the boat retires to a safe distance.

M. GODARD, the aeronaut, has started in Paris a newspaper devoted to aeronautic subjects, and called *Le Montgolfier*. He is building a new monster balloon called *L' Aigle*.

IN the commune of Hure, near La Reole, France, is a vine loaded with 2,500 bunches of grapes, each being from eight to ten inches in length.

ANOTHER steamer, the *General Hunter*, has been destroyed by a torpedo on a river in Florida. It will not do hereafter to say that torpedoes are incapable of doing damage.

THE iron pavement so long in use in Cortlandt street has been removed, and is to be replaced by Belgian pavement. Frost disturbed the iron blocks and rendered them unsafe.

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THE DISCOVERIES OF 1863.

These items of the "Discoveries of 1863," are further extracts from "Wells' Annual of Scientific Discovery:"—

THE MOST RECENT SPECTRUM DISCOVERIES.

The following is an abstract of a lecture on the above subject, recently delivered before the Royal Institution, London, by Professor Miller, F. R. S.:—

"Among the rays, emitted by the sun, there were three kinds, interesting as endowed with special action—those which conveyed heat, light, and chemical action. With heat, he should have but little to do, on this occasion; about light he had something to say; but he was now principally concerned with the rays which manifested themselves by producing chemical action. It was well known that transparent substances did not transmit all these rays with equal facility. Glass was only imperfectly transparent to the chemically active rays, which were found in the most refrangible rays of the spectrum, heat-rays being in the least refrangible portion, and light occupying the middle place. It had been found that rock-crystal was one of the few substances which perfectly transmitted those highly refrangible rays which glass absorbed.

"The professor then showed that some kinds of light were without chemical action, the light from a mixed air-gas flame possessing scarcely any, while that from an ordinary gas flame did possess a little. The oxy-hydrogen flame, while attended with intense heat, was endowed with very little chemical action. A prepared collodion plate exposed to this light for twenty seconds gave a very faint picture. But when the flame was thrown on lime, although the temperature was lower, the light had sufficient chemical activity to produce a strong picture on a similarly prepared plate, exposed for the same time. In the case of the chemically-acting ray, the intensity, number, and position of the lines on the spectrum had been found to vary with the source of light. The most remarkable illustration of this was the different spectra produced by the electric spark of an induction coil between poles of different metals, and projected upon a photographic plate.

"The spectrum produced by the spark from silver poles, for example, was found to be three times the length of the whole of the solar spectrum transmitted by quartz. In order to obtain views of this invisible spectrum, it was necessary to transmit the rays through a medium more transparent to chemical rays than glass, which, it had been said, was opaque to the higher rays of this kind, and various experiments had been made to ascertain what substance allowed them to pass most freely."

PRACTICAL APPLICATION OF THE SPECTRUM ANALYSIS.

A beautiful practical application of the principles of the spectrum analysis has recently been made in England in the casting of steel. In a newly-adopted process of melting the metal, it is important to know the exact moment at which to shut down the cover of the furnace; time must be allowed for the escape of the gaseous products which are injurious to the steel, but if that time be prolonged, an injurious effect of another kind is produced. To meet this contingency, it has been proposed to test the gases as they fly off, by means of the spectroscope; and as soon as the particular color is observed, peculiar to the gas, which begins to escape at the moment the molten metal is in proper condition, the manufacturer will then have an infallible sign of the proper moment for closing the furnace.

JOULE'S NEW SENSITIVE THERMOMETER.

At a recent meeting of the Manchester Philosophical Society, Dr. Joule exhibited an exquisitely sensitive air thermometer, capable of being affected by the $\frac{1}{1000}$ of a centigrade degree of heat. The construction is thus described: A glass vessel in the shape of a tube, two feet long by four inches in diameter, is divided longitudinally by a blackened pasteboard diaphragm, leaving spaces at the top and bottom, each a little over an inch. In the top space, a piece of magnetized sewing needle, furnished with a glass index, is suspended by a single filament of silk. It is evident that the arrangement is similar to that of a bratticed coal-pit shaft, and that the slightest excess of temperature on one side over that on the other must occasion a circulation of air, which will ascend on the heated side, and, after passing across the fine glass index, descend on the other side. It is also evident that the sensibility of the instrument may be increased to any required extent, by diminishing the directive force of the magnetic needle. I purpose to make several improvements in my present instrument; but in its present condition, the heat radiated by a small pan, containing a pint of water heated 30°, is quite perceptible at a distance of three yards. A further proof of the extreme sensibility of the instrument is obtained from the fact that it is able to detect the heat radiated by the moon. A beam of moonlight was admitted through a slit in the shutter. As the moon (nearly full) traveled from left to right, the beam passed gradually across the instrument, causing the index to be deflected several degrees, first to the left and then to the right. The effect showed, according to a very rough estimate, that the air in the instrument must have been heated by the moon's rays a few ten-thousandths of a degree, or by a quantity, no doubt the equivalent of the light absorbed by the blackened surface, on which the rays fell.

ADDITIONAL FACTS RESPECTING THALLIUM.

This new metal, which was first publicly shown at the London International Exhibition, 1863, has since that time been produced in comparatively large quantities. At the meeting of the British Association, 1863, Mr. Crookes, its discoverer, exhibited a mass weighing upward of a quarter of a hundred-weight, and demonstrated its more obvious properties. It is the softest of the new alkaline metals, being easily scratched by a point of lead. When obtained in larger quantity, thallium will doubtless be employed to furnish a magnificent green flame. Eight parts of chlorite of thallium, two of calomel, and one of resin, yields a splendid light on being ignited, and a very little reduction in price would enable it to be used for ship-signals; its extraordinary intensity and monochromatic character enabling it to penetrate through a hazy atmosphere, which alters altogether the color of the ordinary green lights produced by the salts of baryta.

PASTEUR'S RESEARCHES ON FERMENTATION AND PUTREFACTION.

For some years past, M. Pasteur, a distinguished French chemist, has been engaged in investigating the phenomena of fermentation and putrefaction, and the results attained to by him constitute some of the most important contributions made to chemical science during the past few years. In the report of researches heretofore published, M. Pasteur claims to have proved that the effects hitherto attributed to the atmosphere of oxidizing and thus consuming dead organic matter are really dependent on the growth of infusorial animalculæ. In a recent paper submitted to the French academy, M. Pasteur says:—"We must banish from science those preconceived views which consisted in the supposition that a whole class of organic substances—the nitrogenous—could acquire, by the hypothetical influence of direct oxidation, an occult force characterized by an internal movement, ready to communicate itself to organic substances pretended to be slightly stable." And further, "the slow combustion of organic matter after death, though real, is scarcely perceptible if the air is deprived of the germs of the lower organisms. It becomes rapid if the organic matter is permitted to cover itself with molds, mildews, bacteriums, and monads. . . . The intermediate principles of organized beings would be, in some sort, indestructible, if we were able to suppress altogether those beings which God has made so extremely small, so useless in appearance, and life would become impossible, because the return to the atmosphere and to the mineral kingdom of that which had ceased to live, would be entirely suspended."

SUGAR AS FOOD.

Mr. Bridges Adams, the English physiologist, in a recent paper on the "Uses of sugar in assisting assimilation of food," says: "I know by experience the difference in nutritious effect produced by the flesh of tired cattle on a march, and those slain in a condition arising from abundant food and healthy exercise. In a former case any amount might be eaten without the satisfaction of hunger, whilst in the latter a smaller amount removed hunger. But I discovered that certain other food of a different quality, such as grape-sugar and fruit, would help the tired meat to assimilate, and thus to remove hunger." Puddings and fruit-tarts are not, therefore, simply flatteries of the palate, but digestive agents; provided, always, they are not themselves made of rebelliously indigestible materials. The reviewer alludes to the fondness of artisans for confectionery, and of patients just discharged from the hospital asking for "sweets" in preference to "good substantial food," as examples of a correct instinct. There is no doubt that in children, in whom the requirements of growth call for a rapid and efficient transformation of food into tissue, the demand for sweets is very imperious; and parents should understand that the jam-pot will diminish the butcher's bill, and increase the amount of nutrition extracted from beef and mutton.

GLACIAL MUMMIES.

In the year 1844, a man of the commune of Passy situated between Chamounix and Sallenches, went on a pilgrimage of devotion to the celebrated hospice of St. Bernard. He accomplished his journey, paid his devotions to the perilous shrine, and returned by the mountain road to Martigny, where he purchased at the fair then holding there a large roll of cloth, which he intended to smuggle into Savoy, then belonging to Sardinia, while Martigny was, as now, in the canton of Valais, in Switzerland. But the pilgrim of St. Bernard never reached his home in Passy. His wife mourned his absence, the villagers wondered for a few days, and gradually as years glided along, he was comparatively forgotten, and his memory began to be lost in obscurity.

During the last week of August, 1863, however, a hunter crossing the *glacier de Buet*, while leaping a crevasse, had his attention attracted by a dark object below, and peering down into the chasm, he saw beneath a transparent sheet of pale blue ice, a human form laid as in an icy sarcophagus! The features were ruddy and natural, though in horrid contrast to this were the eyeless sockets, whence the eyes had fallen away. The astonished hunter hastened to inform the village authorities of Chamounix of his discovery; and on extricating the body it was readily recognized as that of the long-lost merchant of Passy, and more certainly identified by the roll of cloth bought nineteen years before at the Martigny fair, and which was lying near the glacier-preserved corpse. It was evident that the smuggling mountaineer, in trying to avoid the frontier authorities and regain his home by circuitous Alpine passes, had fallen into some crevasse, and the slow motion of the great glacier had gradually brought the lifeless, frozen body down the slope of Mt. Blanc, to the point where it was discovered.

MECHANISM OF LOCOMOTION.

Prof. Marshall, in a recent lecture on the above subject, before the Royal Institution, London, gave the following as the possible rates of animal locomotion per hour; shark and salmon, sixteen and seventeen miles; flies, four to six miles; eider-duck, ninety miles; hawk, one hundred and fifty miles; worms, thirty feet; race-horse, forty to sixty miles; man walking, four to five miles, running, twelve to fifteen miles. Especial attention was also directed to the advantage of the atmospheric pressure on the joints, amounting in the knee, where so much flexibility is required, to sixty pounds, and in the hip-joint to twenty-six pounds.

VOCAL FISHES.

Dr. Dufosse has communicated to the French Academy an account of certain researches into the vocal powers of certain fish, most of his observations being made upon species of *Trigla* and *Zeus* (gurnards and dories). He states the sounds to be produced by the vibration of the muscles belonging to the air-bladder, and that large gurnards may be heard at a distance of six or seven yards. Out of five or six hundred individuals, of the species mentioned, their voices were comprised between si_2 and re_5 inclusive. The sounds were instantaneous, or prolonged for several minutes, sometimes as long as seven or eight minutes. The pitch often varies during a single "sonorous emission." The finest vocal performers appear to belong to the species *Morrude*, who surpass all their congeners in producing a great number of completely distinct sounds. "They sustain the simple sounds better, and modulate better the compound sounds; they render more distinctly long successions of sounds different in tone and pitch; in fine, there is less dissonance in the sonorous vibrations they produce. Other species, however, beat them in intensity."

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, April 28th. From a great variety of miscellaneous business we select for mention only a sample of the work of—

BLANCHARD'S MACHINE FOR TURNING STATUES.

Dr. Rowell presented an unfinished marble bust in miniature, which had been copied from a full-sized bust of Daniel Webster by means of Blanchard's machine. This machine was invented by Thomas Blanchard, and is a simple modification of his lathe for turning irregular forms, described on page 258 of this volume. The cutting tool in this case is a sharp pointed steel drill, rotating with great velocity, and supported in a lever having its fulcrum at one end, while the opposite end, terminating in a pointed finger bent at right angles, rests upon the bust to be copied. The bust and the block to be sculptured are both secured to the same shaft, and are moved slowly along horizontally while they rotate—the bust beneath the supporting finger of the lever, and the block beneath the cutting drill.

The likeness to the great orator in this machine-made bust was perfect; the deep cavernous eyes and the calm thoughtful expression being reproduced with delicate fidelity.

Dr. Rowell remarked that he was reminded to bring the bust for exhibition to the society by observing an announcement of the inventor's death.

THE USE OF WATER WITH FUEL.

Mr. Stetson, being invited by the chair to open the discussion of the regular subject of the evening, gave a brief account of the chemistry of combustion, and remarked that if there was no absolute increase of heat from the decomposition of water and the burning of its elements—a problem akin to perpetual motion—there might a very large economy result from the mechanical action of water or steam on coal or other fuel.

Mr. Reed described a furnace which has been for some time in use at Newark, N. J. The air enters through hollow grate-bars, and issuing from holes in their lower sides passes up between them to the fire. This circulation of air prevents the bars from melting or burning. Wet tan bark, dripping with water, is shoveled into the furnace, and an intense heat is the result. Whenever the furnace doors are opened the interior of the furnace is filled with smoke, but as soon as the doors are closed the smoke disappears, and a passer-by would not know from looking at the chimney that there was any fire in the establishment.

Mr. Bassett:—At our gas works, near Providence, R. I., we are using superheated steam in the furnaces for heating our retorts, and the saving in fuel is 50 per cent. We have twice as much coke to sell when we use steam in the furnaces as we do when steam is not employed. The waste heat from the furnace passes through an upright boiler in the rear of the retorts, and the steam is brought forward through a pipe which is coiled around the fire-box, where the steam becomes superheated, when it is admitted in fine jets into the fire-box, 5 jets above the grate and 2 below on each side. The steam pipe around the fire-box becomes so highly heated that if a stick of wood is introduced among the coils it quickly takes fire. The heat in the furnace is so intense that we are obliged to use clay retorts for making the gas; iron retorts being destroyed in a short time.

The discussion was continued at considerable length by a number of speakers, but no other new facts were elicited. The same subject was continued, and the Association adjourned for two weeks.

The Cotton Culture in Italy.

We find in *Le Moniteur Illustré des Inventions* the following account of an exhibition at Turin of cotton cultivated in Italy:—

"The principal organizer of this exhibition was M. Devincenzi, a deputy, the same who represented the Italian Government, as commissary general, at the Universal Exhibition at London.

"The number of exhibitors was 207, belonging for the most part to the Tuscan marshes, Sardinia, Sicily, the Campagna of Rome, and the Neapolitan provinces.

"The number of samples of cotton was 685, 306 of which were of the species of Siamese white cotton, 48 of Siamese yellow cotton (red fiber), 82 of herbaceous cotton, 7 of bristly cotton, 80 of New Orleans, Louisiana and North Carolina, 110 of Sea Island, 25 of Mako and 27 belonging to species not classified.

"This enumeration shows that the cultivation of cotton has begun to occupy the serious attention of the Italian people. We announce in another place the formation of a society which is going to introduce this culture on a large scale in the island of Sardinia. A general satisfaction was expressed with the quality of the cotton exhibited. What the Italian producers require is a greater familiarity with the industrial processes. Some laudable efforts are being made to acquire this familiarity, and with perseverance the aim will be soon attained."

MORLEY'S NOISELESS COG-WHEEL.

It is always desirable to have machinery run noiselessly, but with the cog-wheels in factories—or of geared engines in screw propellers and for similar uses, this feature is absolutely necessary to comfort and economy. The wheel illustrated herewith is designed to obviate this difficulty; its principle consists in insulating the periphery, or part containing the cogs, by means of a layer of a non-conductor of sound, placed between the periphery and central part of the wheel.

Fig. 1.

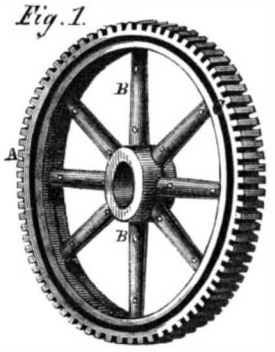

Fig. 2.

Fig. 1, is a perspective view of a finished wheel, and Fig. 2, is a cross section. A, is the periphery, B, the center, and C, the india-rubber or insulating material. The center is formed in two parts, as shown in Fig. 2, and riveted or bolted together so as to gripe the india-rubber between the beveled circumferences and the internal beveled face of periphery, A. In operation, the noise of the cogs which would be transmitted by passing along a solid, is interrupted and absorbed by the insulator. The inventor has a standing offer of $300 for this invention, which will be accepted at the end of three months, if in the meantime a better one is not received. Its utility and value can be tested at a trifling cost by any mechanic. It is cheaper, stronger, and much more durable than a wooden-toothed wheel. This invention was patented on Feb. 10, 1863; for further information address the inventor, F. A. Morley, Station B, New York City.

Utilization of Brine.

Another has just been added to the many instances in which purely scientific research has led to the development of the arts and manufactures. Mr. Alex. Whitelaw, of Sidney Street, has invented and patented a process for the treatment of the hitherto waste brine of salted meat, so as to produce therefrom nutritive and wholesome extract of meat and portable soup. His process is the first practical application of Mr. Graham, the master of the Mint's recently-made, curious, and interesting discovery of "dialysis." Mr. Graham, after pursuing these elaborate investigations on liquid diffusion that have occupied him for many years, found that when animal membranes (as well as some other bodies of a similar nature) were interposed between solutions of various substances and water, that "crystalloid" bodies freely diffused themselves through the membranes into the water; but to "colloid" bodies, such as gum, albumen, &c., the merest film of such a membrane presented an almost impassable barrier. Mr. Whitelaw has availed himself of this principle in his process, which is of the simplest character. He can conduct the dialytic operation in vessels of various forms and materials, but the arrangement he prefers to employ as being in every respect practically the best is a series of bladders, fitted with gutta-percha necks and plugs. These bladders are filled with the previously filtered brine, and hung in rows from poles stretching across and suspended into vats of water. The water is renewed in these vats once or twice a day, and the action allowed to go on; when, at the end of the third or fourth day, it will be found that nearly all the salt and niter of the brine have been removed, and that the liquid contained in the bladders is pure juice of flesh in a fresh and wholesome condition. This juice, as obtained from the "dialysers," may now be employed in making rich soups without any further preparation; or it may be evaporated to a less or more concentrated state, and packed in hermetically sealed tins for sale. The extract of meat thus obtained is in the highest degree nutritive and wholesome, and well adapted for hospitals, for ships' use, and for an army in the field. Mr. Whitelaw has also adapted his process for the use of ships at sea, for the economization of their brine, and for the improvement of the food, and, consequently, the health of the men. The quantity of brine annually wasted is very great. In Glasgow alone not less than 60,000 to 100,000 gallons are thrown away yearly; and if we take each gallon as equal in soup-producing power to 7 lbs. of beef, some idea may be formed of the economic value of this process.—*Glasgow Herald.*

Tremendous Results from the Explosion of a Small Boiler.

Under the head of "Life in Greenock," an English journal describes a boiler explosion which took place in that town. One would think Greenock an undesirable town to settle in, if this be a sample of the life in it. The journal in question says:—

"The *Ruby*, a strong iron screw lighter, with a high pressure engine of 8-horse power, lately arrived at Greenock from Glasgow, deeply laden with coal. She had been in collision on the way down the river, and sprung a leak in the fore compartment or cabin. The *Ruby's* bow was therefore run upon the bank when her stern went down, and immediately thereafter her boiler burst with a tremendous report, which shook the houses for a great distance round to their foundation. Scarcely a house within a circuit of 200 yards but had its windows broken by the concussion. People along the quay-breast suffered severely by pieces of the boiler, coal, and wood entering their houses. What is most remarkable, considering the damage done to the surrounding property, is that only one man was killed, and that not one of the men on board the *Ruby* suffered any injury. A young lad had his leg broken; Mr. M'Kenzie, a pilot, had his leg bruised; Mr. Livinston had his head cut; and others got slight wounds. The scene along the coast was one of great devastation. The street was perfectly wet, and pieces of wreck spread all over the quay. The Lord Clyde Hotel had almost every pane of glass broken. The force of the concussion was so great that in one room the windows and frames were blown in; an infant was carried out of its cradle and lifted fully a yard away, while the cradle was upset; and a servant girl passing along the lobby was carried out to the stair-head. Warner's lodging house suffered most; several stones in the wall were knocked in, and the steam-pipe carried away the boiler and entwined itself in the blind. Pieces of the boiler were carried over the houses and fell in the adjoining streets; one piece, of three iron plates, was carried about 400 yards, over a three-story building."

French Patent for Refining Petroleum.

L. Martin's French patent for refining petroleum, and for a mixture of it with rape-seed oil to burn in common lamps, is thus described:—

"Supposing a tun of petroleum is to be operated upon, about eight per cent. weight of caustic soda dissolved in water is added to the petroleum in a large vat, after which about ten per cent. of tepid water is added, stirred, and the whole allowed to rest for four hours. A precipitate falls to the bottom of the vessel, and the clear is then drawn off with a siphon, and placed in a still. It is now distilled at a temperature of 248° Fah., steam heat being used for the purpose. A light eupion oil passes over at this heat, and 35 per cent. of rape-seed oil is added to it and makes a good burning oil for common lamps. The remainder of the petroleum in the retort is now subjected to heat of from 437° to 600° Fah., when heavier oils are distilled. They are mixed with ten

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per cent. of rape-seed oil for the lightest variety, and five per cent. for the heaviest. This heavy oil also sometimes submits to another purification, by agitating it with very dilute sulphuric acid, then with a weak brine of common salt, and afterward washing with tepid water."

Correspondence

Submarine Telegraphy.

MESSRS. EDITORS:—Will you allow me a little space in your excellent journal to correct an error of fact, respecting the origin of submarine telegraphy, to which my attention has been specially directed in a marked number of the *Telegraphic Journal*, of London, sent me thence by an unknown friend.

In a notice in that journal of April 2d, of the late Mr. Brett's collection of pictures, there is in this incidental remark; "The late Mr. J. W. Brett who was designated by Prof. Morse as *the father of submarine telegraphy*, &c."

I have never designated Mr. Brett, nor any one else as "the father of submarine telegraphy," having always claimed to have first proposed, and personally laid and operated the first submarine telegraph myself.

Mr. Brett I knew well; he was a personal and highly esteemed friend, but I knew that he supposed himself to be the first who had proposed a submarine line in 1845. In conversations with him I always insisted that not only the first proposal, but the first actual execution and operation of such a line belonged to me. I told him I had unanswerable evidence of the fact. This announcement to him I saw gave him uneasiness, and after I left Paris in 1858 for Porto Rico, he wrote me a letter under date of Nov. 15, 1858, in which he asked me to give him the history of my connection with submarine telegraphy. To this letter I replied from Arroyo, Porto Rico, Dec. 27, 1858, quite at length, giving him minutely its history. In that letter (a press copy of which I have by me), I showed him that at least as early as 1838 I had made the proposition of an Atlantic telegraph to Robert Walsh, Esq., the American Consul in Paris, for Mr. Walsh testifies to that fact of his own move, without my knowledge at the time in one of the American journals, of which he was the foreign correspondent. But I refer him also to my letter of Sept. 27, 1837, to the Secretary of the Treasury, published in the Congressional documents, in which letter I suggest the submarine method of constructing a telegraph line. I referred him also to my letter to another Secretary in August, 1843, in which I make the distinct prediction of a future Atlantic telegraph, as a deduction from experiments I had made. For in the autumn of 1842, I had carried into effect the proposition of a submarine line in the harbor of New York, laying out the line personally from Castle Garden to Governor's Island. This was an acknowledged success by the journals of the day, and for this success I received the gold medal of the American Institute. This medal fixes a date (1842) unmistakeably. Mr. Brett rests his claim on the fact that in 1845 he addressed a letter to the British Government proposing oceanic and subterranean telegraphs. The year 1845 is the earliest date to which he appeals, and at that date he had only suggested a plan of submarine telegraphs to the British Government, while three years before I had actually constructed and operated in New York harbor a submarine telegraph line.

It is obvious, therefore, that I could not have designated Mr. Brett as the "father of submarine telegraphy." The *Telegraphic Journal* marks these words professedly as a quotation from a written or printed document of mine. I have never written nor printed any such admission. The nearest to such an admission is the following extract from the historical letter alluded to, which I wrote to Mr. Brett. After giving him a detailed account of the steps I had taken in submarine telegraphy, I say, "I have read your account of the origin and progress of the ocean telegraph with deep interest, and if chronology by its rigid dates gives the origin of submarine telegraphy to me, it cannot detract from you the undoubted merit of having independently originated the project of submarine intercommunication, and successfully carried it out, too, in Europe to a useful result. I esteem and honor you as the *Father of European Submarine Telegraphy*, and I rejoice that both the honor and the profits have been so justly awarded to you."

In thus awarding to Mr. Brett in that letter, the honor of being an independent originator of "European Submarine Telegraphy," I ought to say that if there are other claimants to that position in Europe, I do not pretend to decide between them. I based my remark to Mr. Brett solely on his representations to me, believing him to be as he was, an honorable and high-minded, as he certainly was a generous and worthy man. If the supposed admission on my part that Mr. Brett was the "father of submarine telegraphy," is founded on this letter of mine to him, it is seen at once that it is a misquotation in the *Telegraphic Journal*, and (as I am willing to believe) through mistake, that the important qualifying word "European" was left out, but which is necessary to be inserted to make the quotation conform both to my letter and to the truth of history.

SAMUEL F. B. MORSE.

New York, April 26, 1864.

Strength of Steam Boilers.

MESSRS. EDITORS:—Mr. T. W. B. has been laboring in a number of articles on the "Strength of Steam Boilers," to disprove the truth of the principles of the tables of Mr. Toshach, given on page 71, current volume of the SCIENTIFIC AMERICAN. He claims that the strain to which a boiler shell is subjected varies as the semi-circumference, and yet denies the theory of Mr. Toshach, which supposes the strain to vary with the diameter—not knowing that the two propositions are identical—thus unwittingly admitting what he denies. The trigonometrical lines of the circle, all being functions of one another, vary by the same ratio; thus, if any lineal element, as the diameter, is doubled, all the other lineal elements, as the circumference, sine of any arc, cosine, tangent, secant, &c., or any aliquot part of the same, will be doubled. Hence, if any quantity varies with one of these elements in a given ratio, it varies with each and all of them in the same ratio. Therefore, if the strain on the shell varies as the semi-circumference, it also varies as the whole circumference or as the diameter, or as the radius—which latter term is generally used. This proposition is known and recognized by all well-informed engineers, and enters into the theorem of Mr. Toshach, for the table above referred to.

H. C. PEARSONS.

Ogdensburgh, N. Y., April 28, 1864.

MESSRS. EDITORS:—On page 278, current volume of the SCIENTIFIC AMERICAN, your correspondent "T. W. B." after all that has been written on the subject, sticks to his theory that, "the force to rupture boilers is as the semi-circumference, and 52 per cent. greater than the usual estimate, calculated from the diameter." To be as brief as possible in reply, may I ask him to refer to the figures in his letter (page 278), and also note the following extract from it:—"showing that as E is approached, the required resisting force becomes theoretically infinite;" that is to lift or force asunder the upper semicircle, D F E, from the lower one. Now if the semi-circular theory is correct, the force cannot be "infinite" or decreased in any part, and must be as great at D or E as at F, and at each and every inch above and between those letters; and each of these distinct inches (on the semi-circumference) must exert an equal force in an upward direction. If "T. W. B." will look at this carefully he will be convinced of the correctness of it, before writing on this subject again. "T. W. B." further says:—"From the above I deduce the rule that the force at any one point to rupture at E is inversely as the cosine to the radius; and is mathematically conclusive in favor of the semi-circumference, which will be more plainly evident by inspection of the quadrant F H." Now, Messrs. Editors, I cannot see the slightest difference between the quadrant F H, and any other in the circle below it; nor can I see how he can come to the mathematical conclusion he does from the cosine. I should like to see a formula of "T. W. B's," expressing the relation between the cosine and the semi-circumference, to illustrate its application to the present case. The relation of the semicircle to the diameter is as 1.57 to 1—not as 1.52 to 1, or 52 per cent. as "T. W. B." has it.

WM. TOSHACH.

54 William street, New York.

Employment for Women.

MESSRS. EDITORS:—Recent inquiry into the condition of the working women of Philadelphia has brought to light facts which, in my humble judgment, are neither creditable to our christian feeling or social economy. These facts have been submitted to such parties as were deemed fit, from their acknowledged wisdom and religious culture, to propose some remedy for the dreadful suffering and degradation which working-women are under. But all seemed alike ignorant and hopeless that any measures could be devised that would successfully reach the fact that mothers with one, two, three, four, and five children, have no other means of supporting their offspring than by their own labor, the compensation for which runs from two dollars to four dollars per week (most generally nearer the former sum); and that scores, if not hundreds, of women, born and raised in hope and prayer, are compelled to debase themselves for the necessities of life. Believing that there exists a remedy for this state of things, I cheerfully offer the Treasury Bond, No. 8,712, of fifty dollars, as a premium for the best paper on "Improving the Condition of Working Women."

This is but a small sum for so great a purpose; but it is all, as a poor man, I have to spare. Yet I feel assured that the good results from such an effort, if successful, with the gratitude of the toiling ill-paid women, will make the purse invaluable, and perhaps not unworthy the efforts of the best statesmen in the land.

Communications must not be longer than a tract of ten or fifteen pages; each must have the name of the writer on a separate slip, which will be kept from the examining committee until the decision is given, so that no member of the committee may be influenced by any personal consideration for any writer whom they may know.

Communications must be postpaid, and sent to Mr. Thomas W. Braidwood, School of Design for Women, 1,334 Chestnut street, Philadelphia, who will retain the names of the writers, but hand the communications to the committee for examination.

T. W. BRAIDWOOD.

Philadelphia, April 25th, 1864.

Distributing Petroleum in Pipes.

Le Cosmos, of Paris, announces in glowing terms an invention of M. Forcault, for lighting houses by means of petroleum, in a novel manner. The oil is driven, by mechanism which is not described, through pipes precisely similar to gas pipes, and issues through burners of a peculiar construction, arranged in the same positions as ordinary gas burners. The force that drives the liquid through the pipes would eject it in a stream from the burners if the flow was not controlled by a regulator, which seems to be one of the principal features of the invention.

Le Cosmos says that this system is in operation in several places, and that one of the most frequented saloons in Paris has been lighted by it for more than six months.

Le Gaz suggests that the authorities will prohibit this distribution of liquid petroleum in pipes on account of the great danger of fire.

Report of the Commissioner of Patents.

We commence in this week's issue the publication of the Annual Report of the Commissioner of Patents, and shall continue it in succeeding numbers until it is completed. We hope all our readers will carefully peruse this document, as it is one of the most interesting and valuable that has ever issued from the Patent Office. We shall refer to the subjects so ably discussed by Mr. Holloway, in a future number.

THE new two-cent piece which has been recommended for the sanction of Congress, is said to resemble as much as anything can, a gold coin. On one side there is a wreath of wheat, in the center of which is stamped "2 cents," and around which are the words "United States of America." On the other side there is the shield of liberty, bearing the words, "God our Trust."

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Blasting by Electricity.

The following account describes an apparatus used by the engineer corps of the Philadelphia and Manayunk railroad in some operations on that line:—

"The battery consisted of about 25 copper cells, 1 foot long by 18 inches deep, by 1 inch wide, open at top and bottom; these were set in a wooden frame, and separated from each other by common window glass, which was also secured in the frame; inside of each of these cells was a plate of zinc, just large enough to allow a slip of grooved wood to hold it away from the copper at the ends. Each zinc plate was connected to the copper cell next to the one in which it was placed, making thus a very large voltaic pile. From each end of this battery an insulated wire ran to the holes to be fired; that from one extremity, of course, going from the copper and the other from a zinc plate. The acid used was sulphuric, diluted in about thirty times its quantity of water. The frame was arranged to raise and lower into a wooden trough or bath, which contained the diluted acid, by a windlass, so that the person who was engaged in connecting the main wires to those in the holes did his work without any risk of an explosion, the battery not being lowered into the acid until he was at a safe distance. For firing the holes two wires were taken and twisted together. At first it was thought necessary that both should be insulated, but it was soon found that if one of them was coated with gutta-percha it was sufficient. At the end inserted into the holes these wires were separated about a quarter of an inch, and connected by a very thin piece of platinum wire; afterwards it was found that steel answered every purpose, and was much less expensive. This thin wire melted as the charge of electricity passed through it. At the commencement of the work this was inserted directly into the blasting powder, but two great disadvantages arose therefrom —first, the danger of the small wire becoming broken in tamping the hole; and, second, the difficulty of igniting the coarse blasting powder by the instantaneous spark of electricity; to avoid both of which a small paper bag, large enough to hold about a gunshot charge, was placed over the end and filled with rifle powder, the bottom being pasted, shut, and the top tied securely above the steel wire. Another difficulty then arose from the fact that in handling the 'cartridges,' as they were called, the fine powder was frequently unavoidably shaken out of them. This the men who had charge of loading the holes soon discovered, and before inserting one, would finger the little paper bag to see if it was full, and, as their hands were generally wet, injured the powder. To avoid this, gutta-percha was dissolved in ether, and the cartridge dipped into it; as soon as taken out of the mixture the volatile liquid evaporated, leaving a very thin coating of gutta-percha over the paper. Thus perfected, the 'cartridge' was inserted into about the center of the charge of blasting powder in the hole, the opposite ends of the wire protruding, tamping was put in exactly as if fuse were used instead of wires. Before firing, a number of holes were connected together, by taking the protruding end of one wire of the first hole and twisting it to the end of one of the second, the remaining one of the second to one of the third, and so on. One of the main wires from the battery was then connected with the end of the first wire of this 'batch,' and the other to the end of the last; the battery was then immersed in the bath containing the acid, and the discharge of the whole lot was instantaneous and simultaneous. As many as twenty holes were frequently fired in one lot. The working of this arrangement was eminently successful. For three months an average of nearly one hundred holes a day were fired at each tunnel without a single accident, so far as the blasting was concerned. This system is almost identical with the one invented in France. Many of the details, such as coating the bag with gutta-percha, &c., will be indicated by local circumstances to practical minds."

On the Purification of Sulphuric Acid, by F. Maxwell Lyle, Esq.

The best means of obtaining sulphuric acid entirely free from arsenic fully bear out the fact recorded by MM. Bussy and Buignet, viz:—that arsenic, in order to pass during distillation, must be present in the state of arsenious acid. I have, however, been led to employ a different mode of purification, chiefly with a view to insuring the complete absence of all nitrous products, and obtaining a pure acid from the very first, and of thereby obviating the necessity of changing the receiver—a most dangerous operation when distilling sulphuric acid. If the acid contains nitrous compounds, I heat it in a porcelain capsule to a temperature of about 110° C., with a small portion of oxalic-acid, till the latter is completely decomposed, and all effervescence has ceased; about ¼ or ½ per cent. is amply sufficient for nearly all samples of commercial acid. It is best to add the oxalic acid before heating, and to stir constantly till the reaction is completed. I now allow the acid to cool down to about 100° C., and add to it a solution of bichromate of potassa in sulphuric acid, or some of the salt itself in fine powder, until the pure green color at first produced by the formation of sesquioxide of chromium is replaced by a yellowish green, indicating an admixture of chromic acid in the free state. The acid so prepared, being now distilled, passes from the first perfectly free from all impurity. The addition of the bichromate has another advantage, viz: that if it be first of all applied to a small sample of the commercial acid, it indicates the presence of free sulphurous acid, as well as of arsenious acid, and either of these being present, we may presume on the absence of nitrous compounds. No doubt permanganates would answer equally well; but the bichromate of potassa, which is cheap and easily procured, is so convenient and inexpensive as to leave nothing to be desired.

Broadside and Turret Guns.

At a recent meeting of an association of Naval Architects, in London, Mr. Norman Scott Russell read a paper on the above subject, which will be found interesting to our readers:—

"Adverting to the assumption made by Captain Coles and others, that 300 or 600-pounder guns, weighing from 12 to 20 tuns each, cannot be carried as broadside guns, Mr. Norman S. Russell shows by some simple calculations that this assumption is absolutely erroneous. Such vessels as the *Warrior* are quite capable of carrying a full armament of 12-tun guns instead of their present 68-pounders, without increasing their displacement more than two or three inches, or losing their stability. With regard to the difficulty of training such heavy guns, that is already felt with the 95-cwt. 68-pounder to such an extent that it is doubtful whether it could be used in a heavy seaway. However, Mr. Cunningham's very simple application of steam power to the working of ship's guns disposes of the difficulty as regards either class. With respect to the width of port, Mr. Russell admits that, for the 300-pounder, the broadside port would have to be 28 inches wide to admit of training to an angle of 60 degrees against a width of 23 inches in the cupola port. But he considers that Captain Coles has far over-stated the question in assuming 3 feet square for the broadside port. Mr. Russell also admits the advantage which the cupola system presents in the weight of a battery being borne amidships, so as to cause less rolling than heavy weights winged outwards. The great arc of training, commanded by the turret, is one of the chief advantages claimed for it. Mr. Russell considers this much over-rated, especially when more than one cupola is carried, on account of the obstacles offered by masts and rigging, boats, hatchways, and especially by other cupolas, if the vessel carries more than one. In the vessels designed by Mr. Coles, there is a great disadvantage in the main-deck being at so much lower a level than is usual in vessels of similar tunnage—thus exposing the deck to vertical fire from ships with higher topsides, and, moreover, being washed by green seas where other vessels have a dry deck. With regard to the depression of the gun, Mr. Russell remarks that it is doubtful whether in any case a lee gun could be used with advantage in a sea heavy enough to wash the gun deck; and as to the weather guns, a broadside gun could certainly be depressed more than a turret gun placed amidships, unless the latter fired through her own deck and topside. Mr. Russell then proceeds to compare in detail the merits of ships carrying one, two, or three cupolas with vessels carrying the same weight (in guns and armor-plating together) distributed as a broadside battery. The result, as he gives it, is, that for one cupola, as against the corresponding broadside ship, the cupola has the advantage; for two cupolas the advantages are, if anything, in favor of the broadside, although nearly balanced; but for three or more cupolas, the broadside arrangement has a marked superiority, which increases in a rapid ratio with the size of the vessel. Mr. Norman S. Russell accordingly comes to the conclusion that the proper use of the turret is for moderate-sized vessels carrying one or at most two of them; and he thinks that one or two cupolas may be usefully substituted for pivot guns on the upper decks of ships-of-the-line carrying a heavy broadside armament. Finally, he remarks that this is a question for the naval officer rather than for the naval architect to decide, since neither plan presents any constructive difficulty, and he quotes Captain Symond's authority for stating that speed and facility of maneuvering are of at least as high importance as complete protection."

The Great Contest between Whitworth and Armstrong.

The (London) *Engineer* of April 8th says:—

"The long-expected contest between the Whitworth and Armstrong systems of artillery commenced this week at Shoeburyness, in the presence of most of the members of the Select Ordnance Committee, and a large number of noblemen and gentlemen interested in the subject.

"Sir William Armstrong is represented by three 12-pounder breech-loaders and three muzzle-loading shunt guns of the same caliber, and Mr. Whitworth by three muzzle-loaders of the same size. These nine guns are already on the ground, and three 70-pounder Armstrong breech-loaders, and three 70-pounder Whitworth muzzle-loaders are on their way from Woolwich to Shoebury.

"The details of the trial are kept secret at present; but it is pretty well known that a minimum of 3,000 rounds will be fired from each gun. The contest will be necessarily very tedious, and will extend over a period of two or three months, if not more. At first sight this seems to be an unnecessary expenditure of time and money, but the committee are desirous of testing these arms to their very utmost capacity, at every range, with every variety of projectile, and against every kind of defense. They will also be tested with reference to the quickness with which they can be charged and fired. After the 3,000 rounds have been fired, it is believed that the guns will be subjected to a series of proofs with gradually increasing charges of powder.

"The trial commenced with one each of the three descriptions of 12-pounders. Seven rounds of solid shot, three of dead segmental shells, and five of dead common shells were fired point blank, to test the exact range of each gun. Six rounds of solid shell were then fired at one degree of elevation, and the contest was prematurely stopped by a violent storm of rain and wind, which swept across the marshes from the south-west. Up to the last three or four rounds the weather has been most balmy and spring-like, there being hardly a breath of wind stirring to interfere with the practice.

"As so much work has to be gone through, it will hardly be possible to get even a glimpse of this most important and interesting contest before, at least, seven or eight weeks have elapsed. The results of the more interesting experiments will be given from time to time; but it must be remembered that they will only form units in the figure of merit that is to decide the contest.

"Since last the Whitworth 12-pounders were tried at Shoebury, Mr. Whitworth has strengthened them with an extra coil at the breech, making them nearly 20 per cent. heavier than the Armstrongs of corresponding caliber, which weigh rather more than 8 cwt. He has also, at the suggestion of the Ordnance Committee, opened a vent through the top of the breech, as well as through the caseable, the method of firing the gun through the caseable vent being thought dangerous to the gunners. The gun tried was fired through the breech vent."

THE iron-clad *Rede Italia*, whose remarkable passage we chronicled, lately went across the Atlantic at the average rate of 13 miles an hour. With steam from only four boilers the engines made forty turns with the utmost ease.

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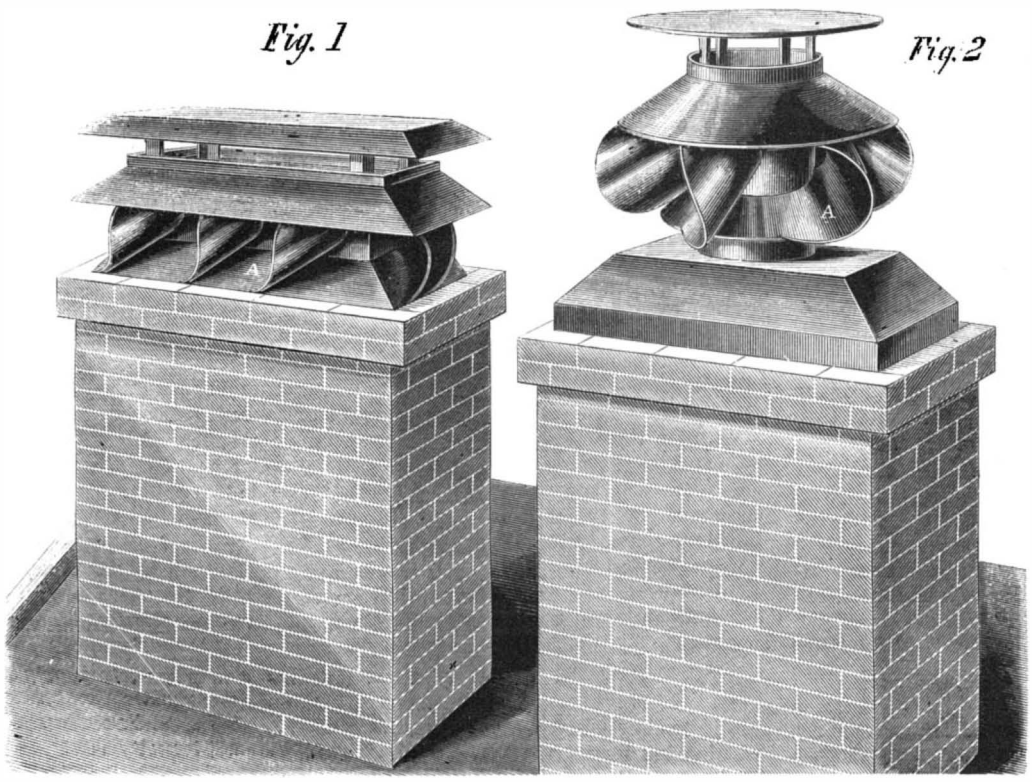
Chimney Cap and Car Ventilator.

The annoyance and discomfort of a smoky chimney is very often experienced, even in houses that have been carefully built. Sometimes local causes, such as other chimneys in close proximity being higher than the defective one, are the source of the trouble; in others the defect is in the construction of the flue. The engravings (Figs. 1 and 2) published herewith represent an improved chimney cap which is intended to prevent the trouble alluded to. The cap is peculiar in shape and appearance and is designed to aid the draught by causing the smoke ascending to be literally screwed out, or create a current in the chimney by leading the heated air and unconsumed gases through a series of curved passage-ways, A. The natural and rapid circulation of the air outside the chimney being counted upon as an active agent to produce this effect. The inventor says, in his circular, that smoke naturally assumes curved and rolling outlines in its ascent, and that he has aimed to adapt his chimney cap to this appearance. He further says, in respect to its other qualities :—

"When this cap, with its wings or funnels, is stationary, the outer current of air is made to perform the desired curves on the inner current by catching it at the side and thereby twisting it outward. All sides being alike, if the gale sweeps round in whirlwinds it only assists the draught; or let fog come down and it still carries the smoke away by striking the caps so as to produce an outward draught at every opening. We place two or more of these funnels in the shape of trumpets on the side of a locomotive smoke-stack, the mouth of the trumpet being in front, and carry the narrow end rounding to the side of the stack, so as to produce a side draught on the smoke, the speed of the engine creates a draught backward, together with this side draught by the same cause, and the effect will be a twist or curl in the smoke so as to keep it out of the way of the train. Its advantages as a car ventilator are easily seen, from the fact that there are frequently opposite draughts—one by the speed of the train, the other by the wind being in an opposite direction or on one side. Before applying for a patent, this cap was thoroughly tried on a chimney that was and is yet soaked through with creosote oil so as to be greasy on the outside; this chimney for two years was a great pest; since this cap was put on it has worked perfectly. Wherever it has been tried it has succeeded just the same. Testimonials might be brought to show the efficacy of this ventilator, but it needs nothing more than an examination of its merits to satisfy the most skeptical."

This chimney cap was patented on Sept. 8, 1863, through the Scientific American Patent Agency by James Tomlinson, of Racine, Wis. For State and county rights, and all further information, address the nventor as above.

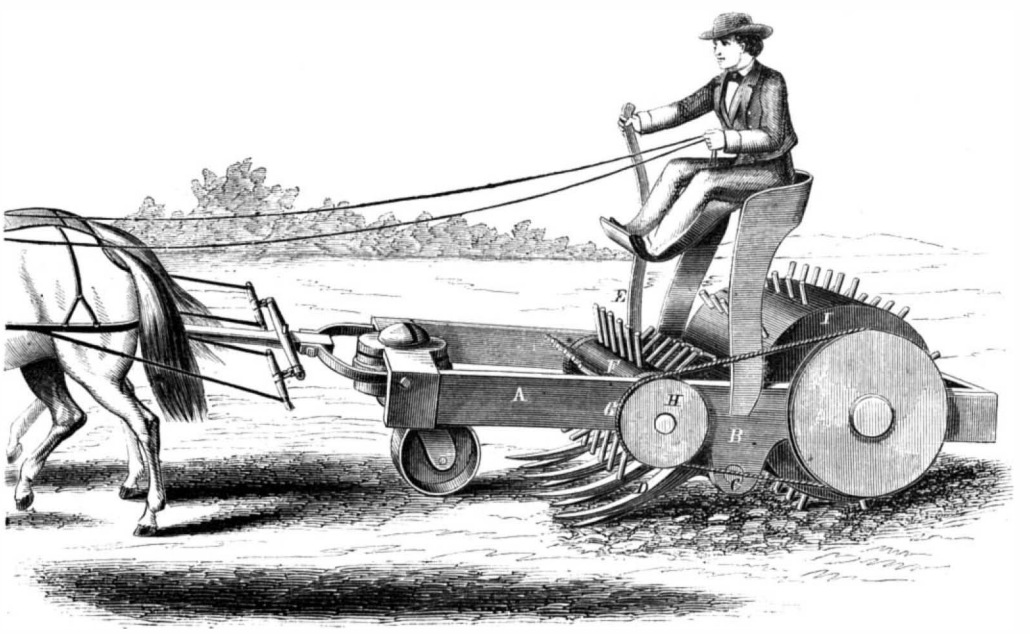


TOMLINSON'S CHIMNEY CAP AND CAR VENTILATOR.

Machine for Tilling the Soil.

This engraving represents a new machine for tilling the soil by forking up its surface and afterward crushing or pulverizing the clods so that the earth is fitted for the reception of seed. The construction and operation will be understood by referring to the appended description. The frame, A, has a projecting portion, B, which carries a shaft, C. This shaft has a set of forks, D, upon it, which enter the soil as the machine advances. The hand of the driver is seen grasping a lever, E, at one side; this lever is affixed to the shaft the forks are on, and bears against a pin in the side of the frame, A, when the forks are at work, so that they cannot enter the ground too deeply By pulling on the lever the forks can be raised entirely clear of the ground. Immediately over these forks is placed a small roller, F, driven by a belt, G, passing over a pulley, H, from the larger roller, I, in the rear. The teeth of the roller, F, catch all the weeds and grass which may be drawn into the forks and pull them out, thus preventing them from getting clogged. By the continued operation of the machine these weeds are thrown on to the larger roller by which they are deposited in the rear of the machine. This roller, F, also serves to pulverize the clods and break them, so that the soil is evenly tilled. The large roller behind has teeth, as may be seen, which, entering the ground, cause the machine to advance, and it also serves to level or roll the surface after the forks have harrowed it up so that it presents an even and level appearance. This large roller may be placed in front of the forks, if desired, and this position is preferred by the inventor when the ground has been plowed and large lumps occur; these lumps are crushed by the roller and the forks work easier in consequence. The caster-wheel in front permits the machine to be turned easily in any direction, and the peculiar attachment by which the horses are connected to the front is also an advantage, as they may turn slightly to right or left without diverting the machine from its path.

This machine is the invention of William Wadsworth, of Sacramento, Cal., and a patent is now pending through the Scientific American Patent Agency. For further information address the inventor at that place.



WADSWORTH'S MACHINE FOR TILLING THE SOIL.

Ingenious Legerdemain.

Two brothers, of the name of Davenport, are attracting considerable attention in this city by exhibitions of legerdemain, or spiritualism, whichever the audience choose to call it. If considered as sleight-of-hand the tricks are quite ingenious, but if attempted to be passed off as real-ly manifestations of supernatural power, the effort is ridiculous. The young men are tied in a cupboard on the stage, and the instant the doors are closed a trumpet is thrown out through a hole in one of the doors. All of the tricks are based on plans of slipping knots and ropes, a matter to which so much thought and inventive faculty has been devoted during the last few years by the exhibitors of humbug spiritualism.

THE WESTERN PENNSYLVANIA SANITARY FAIR.—The loyal people of western Pennsylvania have determined to aid the Sanitary Commission by establishing a Fair similar in its objects to those already so successful throughout the country. It is to be hoped that our people will contribute as generously in this case as they have in others and enable the good citizens of the section in question to swell the funds of the Commission by a handsome sum. Contributions of every kind will be thank fully received, and any of our readers who may have small wares which are new and saleable, recently patented, will find this a capital method of introducing them to the public. The committee to receive donations are William B. Lare, of the *Pittsburgh Dispatch*, H. J. Murdoch, of the *United Presbyterian*, and William Neeb, at Pittsburgh, Pa.

THE London *Engineer* says:—"It appears that in some of the steamship lines where surface condensers have been used for a few years they are now being abandoned. It is asserted that the saving in fuel does not compensate for the increased repairs."

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VOL. X. NO. 20..[NEW SERIES.].....*Twentieth Year*

NEW YORK, SATURDAY, MAY 14, 1864.

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GREAT IMPROVEMENT IN FEEDING ARMIES.

On the 30th of July, 1850, Gail Borden, Jr., then residing in Galveston, Texas, now of Elizabethport, N. J., obtained a patent for concentrating animal food by which it was rendered far more portable, and could be kept sweet and fresh for a long period. After securing patents for his improvement in foreign countries, Mr. Borden bought droves of cattle in Texas, and prepared large quantities of food by his process. But he neglected to have his new article tried and advertised so as to create a demand as rapidly as it was produced, and he consequently found a large supply on his hands for which there was no market. Though the numerous shipmasters and others who tried it recommended it in the highest terms, the enterprise of manufacturing it did not succeed. It led Mr. Borden, however, to the invention of his plan for condensing milk, out of which he is making money fast enough. We record this fact with great satisfaction, as Mr. Borden is the most loyal of men.

We have just received a pamphlet from Professor E. N. Horsford, late of Harvard University, in which Mr. Borden's scheme of concentrating animal food is urged upon the Government as the proper plan for preparing fresh meat for our armies. Prof. Horsford discusses the subject with all the lights of statistical returns, and with those of the most profound physical, chemical, and microscopic science. He shows that an ox weighing 1,800 lbs. on the hoof yields only 112 lbs. of dry food, and that by the actual methods practiced in the army only 18 lbs. is utilized!

Prof. Horsford's plan is to make the fresh meat for the armies into sausages. He would have a large establishment erected by the Government in Illinois, and have it furnished with all suitable vessels and conveniences for conducting the operations. He estimates that this plan would effect a saving in feeding our armies of more than $100,000,000 a-year, besides supplying the soldiers with more healthful and palatable food, and increasing very largely that all-important element, the mobility of the troops.

We have been frequently impressed during the progress of the war with the efficiency of the Commissary Department of the army. It has been uniformly praised in the reports of commanding generals, and we have never seen a word of complaint against it in the letters of newspaper correspondents, of subordinate officers, or of private soldiers. To the able and intelligent officers of this department we commend Prof. Horsford's suggestions as worthy of the most careful consideration.

IN England bean meal is extensively used for fattening hogs.

A PLEA FOR INVENTORS.

Many good machines and useful inventions are condemned prematurely and thrown out of use for want of a little practical common sense on the part of those who operate them, and we regret that even in this day of machinery, when its use is all but universal, there are many narrow-minded and conservative individuals who are so wedded to old ideas and old-fashioned ways of doing work, that they see no good in any thing that tends to save it, and every improvement is, in their eyes, a "new-fangled humbug." It is surprising to see the extent to which this indifference, or worse than indifference, is carried, and it is but simple justice to inventors that their efforts to benefit society should meet with more encouragement from it.

One patient, earnest and energetic inventor of a capital washing machine, said to us recently: "The greatest difficulty I have to contend with is the prejudices of servant girls; they throw up their hands in horror when the machine comes home, and give such doleful accounts to their masters and mistresses of the machine's inefficiency, that I experience serious loss in consequence."

This is precisely the same trouble that many others have to encounter, and we feel it to be so unjust to inventors that we herewith remonstrate against it. Servants are not alone to blame, either; very many others who should be more thoughtful look upon a new invention as something that will take care of itself, that requires no judgment or practice to become acquainted with its virtues, and if they "don't get the hang of it," so to speak, at the first trial, they not only throw it aside themselves, but condemn it as useless to their circle of acquaintance.

Now this is all wrong. An indvidual has no more moral right to slander a new invention than he has the character of respectable people, and the gross injustice of it will be apparent to all thoughtful persons. A lady said to us the other day, "I don't like Wheeler & Wilson's machine;" and when we inquired the reason, she replied, "Oh, the threads break sometimes." Poor woman! What a distressing hardship! Another complains of clothes-wringers, and don't like them because it is too much trouble to fasten them on the tub, &c. Now, these all seem very trivial matters in themselves, but it is not the simple refusal of these benighted individuals to employ the results of ingenuity, but the bad influence they exercise on the community that we deplore.

This article is not a plea for useless machines, or for any special machine, but it only asks that common justice be shown to new inventions. Try them as if you wanted to get the benefit of them, reader! and not as if you expected to see them get up and walk and talk. Put them upon their merits alone, and if you are satisfied that you have done all that you would if the machine were your own, and still fail, ask some of your acquaintances to help you out of your trouble, and you will doubtless be successful. A little oil goes a great way sometimes, and a screw loose, or a pin out of some part, makes an important difference in the action of a machine. Always be sure you are right, and then go ahead; and if you use as much common sense in trying a new invention as you do in the ordinary affairs of life, you will not be disappointed.

HAP-HAZARD.

When a man does work at hap-hazard he generally repents of it. Taking a size on a rule at random has spoiled many a fine piece of work, and giving the handle of a slide-rest on a lathe or planer a turn too much, has been the means of throwing heavy shafting out of the center, smashing the shears, the slide rest itself, and very often the face plate of the lathe. The skillful artisan shows his superiority in dealing gently and cautiously with his work, and it is only the tyro that jumps to conclusions, and guesses where he ought to be positive. All men are liable to accident and mischance, none more so than mechanics, upon whom depends a great deal at the present time, but skill is needed, not sleight of hand, and sober progress instead of the haste that makes waste. No come-by-chance job can be a good one, and there is no place where cool heads are more required than in the workshop. Manual dexterity is a good thing, but that does not mean tricks, legerdemain or capers of any sort. It is far better to take a reasonable time and do the job in hand well, than to rattle it off "any how," and have it to do over again."

THE CHENANGO BOILER EXPLOSION.

No verdict has been rendered by the jury in this case up to the time we go to press, but it seems quite probable that they will come in with the usual one in such cases—"mysterious accident," enormous pressure suddenly generated, some nonsense about superheated steam, &c. &c. From the evidence adduced from the examination of disinterested practical men, it appears that the boilers were not properly braced, and exploded in consequence. This is, in plain English, the cause of the disaster. A strain of nearly ten tuns was brought upon each iron strap only five-eighths of an inch sectional area, to which the braces between the arches of the fire-box and the flat shell of the boiler were connected, and they naturally gave way in consequence. There were but thirty-two of these straps instead of sixty-four—just half the number called for in the specification, and the disaster which occurred is the result of the omission. By the acceptance of the boilers by the Government, the contractors (the Morgan Iron Works) are relieved from all blame in the matter.

THE DAILY PRESS AND MECHANICAL REPORTS.

In the inquest on the *Chenango* disaster the most ridiculous blunders were repeatedly perpetrated through every paragraph by the reporters of the daily press. We read in the *Times* that iron is "minched," instead of punched; and we hear of "ciphering gages," instead of siphon gages. Mr. Martin is made to say that he "thinks 64 lengths of the hose shown is sufficient to stay my boilers measuring 18 feet by 10 inches, at 60 pounds to her square inch." Mr. De Luce is charged with saying that he thinks 20,000 lbs. a very high estimate for a piece of iron to resist a boiler. It requires as much study to find out what the gentleman testifying *did* say as to arrive at the cause of the explosion. Mr. Martin especially must be highly gratified with the important discovery in staying boilers with "hose," which the reporter fathers upon him.

ON BOILING WATER.

Mr. W. Grove, F.R.S., in a lecture before the Royal Institution, presents some facts on a subject lately brought to the notice of this association. He first alluded to the statements of Donny before the Brussels Royal Academy, in 1843, that in proportion as water is deprived of its air, the character of its ebullition changes, becoming more and more abrupt, and boiling like sulphuric acid with jumps (*soubresauts*), and between each burst of vapor, the water reaches a temperature above its boiling point. To effect this it is necessary that the water be boiled in a tube with a narrow orifice, through which the vapor issues; if it be boiled in an open vessel, it continually re-absorbs the air and boils in the ordinary way. Mr. Grove found that with the oxy-hydrogen gas given off from ignited platinum plunged in water, there was always a greater or less quantity of nitrogen mixed, which led him to examine more carefully the phenomenon of boiling. He arranged two copper wires parallel to each other in a Florence flask, so as nearly to reach the bottom; the lower ends were united by a platinum wire, about an inch and a half long, which was curved horizontally. Distilled water which had been boiled and cooled in an air-pump vacuum, was poured into this flask so as to fill about one-fourth of its capacity. The whole was placed under the air-pump receiver, and a connection was made with the wires of a voltaic battery. In this manner the platinum wire was heated and the boiling continued indefinitely. The effect was curious; the water did not boil in the ordinary way, but at regular intervals bursts of vapor took place, after which the water was perfectly tranquil.

Another experiment was made with a glass tube five feet long and four-tenths of an inch internal diameter bent into a V-shape, into one end a loop of platinum wire being sealed with great care. Into this tube water, purged of air, was poured to the depth of 8 inches, and the rest of the tube was filled with olive oil. The experiment of boiling presented nearly the same peculiarities as those already men-

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tioned. It was continued for many hours, and even days. It was found that at each burst of vapor a minute bubble of gas passed up through the oil without being condensed, this was proved to be nitrogen. To avoid any suspicion about boiling by electrical means, similar experiments were made in which the boiling was produced by a spirit lamp, and similar results were obtained.

He was led to try the effect of boiling an elementary liquid, and bromine occurred as the most promising one to work upon. The temperature of the bromine was first raised till its vapor had driven all the air from the glass tube, when the tube was sealed by the blow-pipe. The bromine vapor on condensing left a vacuum above it. After boiling, a notable quantity of a permanent gas was found to have collected in the tube, and this gas proved to be pure oxygen. The experiment was repeated with chloride of iodine with the same result, only the quantity of oxygen was greater. Mr. Grove also described his fruitless attempts to obtain in this way the vapors of phosphorus and sulphur. He barely alluded to the result on the compound liquids, such as oils and the hydro-carbons, as the fact that permanent gas is given off in boiling such liquids would not be unexpected.

The experiments seem to show that boiling is by no means necessarily the phenomenon that has generally been supposed, viz: a separation of the cohesion in the molecule of a liquid from distension by heat. He believes from the investigation he has made that (except with metals, on which there is no evidence) no one has seen the phenomenon of pure boiling without permanent gas being freed, and that what is ordinarily termed boiling arises from the extracting of a bubble of permanent gas, either by the chemical decomposition of the liquid, or by the separation of some gas associated in minute quantities with the liquid, and from which human means have hitherto failed to purge it. This bubble once extracted, the vapor of the liquid expands it; or, to use the appropriate phrase of Mr. Donny, the liquid evaporates against the surface of the gas.

Mr. Grove's experiments are in a certain sense the compliment of those of Mr. Donny. The latter showed that the temperature of the boiling point was raised in the same proportion as water was deprived of air, and that under such circumstances the boiling took place by bursts or jumps (*soubresauts*). Mr. Grove has shown that when the vapor liberated by boiling is allowed to condense, it does not altogether collapse into a liquid, but leaves a residual bubble of permanent gas, and that at a certain point this evolution becomes uniform. Boiling then is not a result of merely raising a liquid to a given temperature, it is something much more complex. Enough had been shown by his experiments to lead to the conclusion that hitherto simple boiling, in the sense of a liquid being expanded by heat into a vapor without being decomposed, or having a permanent gas eliminated from it, is a thing unknown. Whether such boiling can take place may be regarded as an open question. He was inclined to think that it cannot; that if water, for instance, be absolutely deprived of its nitrogen, it would not boil till some portion was decomposed; that the physical severance of the molecules by heat is also a chemical severance. The constant appearance of nitrogen in water. when boiled off out of contact with air, almost to the last drop, is a matter well worthy of investigation. He would not speculate on what possible connection there may be between air and water. The preponderance of these two substances on the surface of our planet, and the probability that nitrogen is not the inert diluent in respiration that is generally supposed, might give rise to not irrational conjectures on some unknown bond between air and water. But it would be rash to announce any theory on such a subject—better to test any guess one may make by experiment, than to mislead by theory without sufficient data, or to lessen the value of facts by connecting them with erroneous hypotheses.

One hundred and fifty watches per day, or one every four minutes, are now turned out at the Waltham Watch Factory. When the contemplated addition to the company's work is completed, about double the present number of hands—about 550—will be employed.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Fluted Ruffles.—In the manufacture of fluted ruffles and fluted or gauffered trimmings and fabrics generally, it has been common to use, for the purpose of retaining the flutes in place, a thread which, after having been coated with a solution of gum or other adhesive material, is placed in contact with the flutes and caused to adhere thereto. There is no objection to the use of this thread on white muslin goods, but in silk and colored goods the moisture which is in the said thread when it is first applied, frequently produces a stain or discoloration. This invention consists in the manufacture of fluted ruffles without the use of an adhesive thread by pressing down the flutes into a flat or plait-like form at any portion of the width of the ruffle, with such a degree of pressure that the so-pressed portion will retain its pressed form and also the flutes in place, Thomas Robjohn, of Mott Haven, N. Y., is the inventor of this improvement.

Mowing Machine.—This invention relates to a new and useful improvement in adjusting or raising and lowering the cutter bar, and in parts connected therewith, to wit, the brace rod and track-clearer. The invention also relates to an improved draught attachment for keeping the cutter-bar free from the surface of the ground, and also in an improved means for connecting the working parts with the axle of the machine, whereby the use of a framing for the purpose is avoided. James Pine, of Troy, N. Y., is the inventor of this improvement.

Exercising Machine.—The object of this machine is to obtain a device of simple and economical construction which will admit of the lower limbs of the human body being exercised with a view of strengthening them in cases of paralysis and like diseases, and in such a manner that the patient will not suffer from over-exertion in operating the device, but will only bring such muscles and partts into play which are designed to be strengthened thereby. Charles F. Taylor, M.D., of New York city, is the inventor of this improvement.

Springs for Cars and other Purposes.—This invention consists in a series of coil springs of pyramidal form, arranged in rows side by side, each alternate row of pyramids being inverted so as to permit the combination of many springs within a small space. The springs are inclosed in a suitable box or frame, and several series of springs may be employed, arranged above each other with a plate between every series. The boxes are also made in a peculiar manner so as to afford convenient access to any of the series of the springs. These springs appear to possess the merit of strength, durability, simplicity and cheapness. Ulysses B. Vidal, Philadelphia, Pa., is the inventor.

Improved Revolver Fire-arm.—The peculiar feature of this revolver is that it is loaded in front of the cylinder with metallic cartridges, requiring neither the taking out of the cylinder nor the opening of the frame, and it is therefore very convenient. The fulminate priming of the cartridges is contained in a flange extended longitudinally from the rear instead of laterally, as in other fixed ammunition. The hammer strikes upon this flange through an opening in the rear of the cylinder to each chamber. The discharged shells are removed from the chambers by means of a sliding pin which is attached to the frame, and is never required to be disconnected from the arm, and therefore can never be lost. As a handy and durable weapon it cannot be surpassed. It is the subject of two patents, and applications on new points are now pending. The cartridge is the subject of a separate patent. This revolver is made of different sizes and in various styles of finish. We have had a pistol exhibited in our office which is one of the handsomest fire-arms we have ever seen ; the stock, frame and barrel are most beautifully engraved and heavily plated with silver, the cylinder gilt and the handle made of ivory. It was made by Plant's Manufacturing Co., New Haven, Conn., and is valued at $75. The inventors of this revolver are Messrs. Reynold's, Plant and Hotchkiss, of New Haven, Conn.

Concussion-bulb for Fuses.—This invention consists in the employment for the fulminate priming of a fuse, of a small glass bulb containing a liquid hermetically sealed and having its exterior coated with a chemical substance. This bulb is broken by the concussion of the shell in striking, and the acid coming in contact with the potash and sulphur produces a mixture which at once takes fire and ignites the charge. George P. Ganster and Isaac S. Schuyler, of New York city, are the inventors of this improvement.

NEW BOOKS AND PUBLICATIONS.

The Management of Steel. By George Ede. D. Appleton & Co., Publishers, New York.

This work is a re-publication from the second English edition, and its character stands high abroad as a clearly-written and intelligent book upon the subject it treats of, which, it is almost needless to add, is a very important one. The art of working steel is yet in its infancy, and any information which will add to the general stock will be gladly received by all practical persons. This book is especially valuable to many mechanics for the reason that it gives specific instructions upon certain intricate and difficult kinds of work; hardening, annealing, shrinking and forging steel are treated in a lucid and vigorous manner. The author, Mr. Ede, has been for twenty years employed in the Woolwich gun factories of England, and may be considered as an authority upon the subject he writes of. Price 50 cents.

Atlantic Monthly. Ticknor & Fields, Publishers, Boston, Mass.

This excellent magazine deserves more commendation from us than we can find space for. It is gaining popular esteem very rapidly while it steadily maintains its high character as a monthly periodical. The "House and Home Papers" of Mrs. Stowe are not only interesting but instructive, and combine the useful with the sweet in a most agreeable way. In the May number, which we have received, "A Cruise on Lake Ladoga" opens a new country to the eyes and ears of "fireside travelers," or those who, unable to journey abroad, depend upon others for their enjoyment of this kind. For sale at the bookstores.

Inventive Progress.

"The progress of inventions is one of the most noticeable features of the day. The Scientific American of last week had fully three pages of its reading matter filled with inventions for which patents had been granted. These improvements do not relate principally to the destructive art, but sweep over the whole field of industrial activity. Among the names published we notice those of ten or twelve Jerseymen, showing that this State furnishes her "quota" of inventors as well as of brave volunteers. Messrs. Munn & Co., proprietors of that journal, have built up a prosperous business which has out distanced all competition in both hemispheres. We can recall to mind at least half a dozen attempts made to supplant them as publishers and patent-agents; but all have languished and finally given up the ghost. So much for a conception at the right moment, diligently pursued through successive years, in a spirit of accommodation to the public as well as of advantage to themselves."

[We copy the above from the Paterson (N. J.) *Daily Press*, a most excellent paper, and we thank Messrs. Wright & Chiswell for their kind testimonial. —Eds.

SPECIAL NOTICE.

Luke V. Newton, of New York City, has petitioned for the extension of a patent granted to him on Aug. 20, 1850, for an improvement in preparing the face of metallic types, engraved plates, &c.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Aug. 1, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

A most extraordinary incident occurred during the attack of a rebel iron-clad ram on our fleet in Albemarle Sound. Capt. Flusser, of the *Miami*, fired an 11-inch gun at the iron-clad, which rebounded from the sloping sides and struck the unfortunate officer, killing him at once.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING APRIL 26, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

42,453.—Hardening Cast Iron.—Thomas Allin, New York City:

I claim the process, substantially as above described, of hardening cast iron by plunging it in a bath of acid and water when it is about a blood-red heat, substantially as set forth.

42,454.—Rake for Harvesters.—N. Allstatter, Hamilton, Ohio:

I claim the rake-shaft, C, provided with a crank, c, in connection with the sliding clutch thimble, I, provided with the arms, m m′, oblique plates, n n′, on the segment plate, E, and the curved plates, K K′, all arranged for joint operation as and for the purpose herein set forth.

In combination with the parts specified in the foregoing claim, I further claim the flexible or jointed rake-head, arranged to operate substantially in the manner as and for the purpose herein set forth.

[This invention relates to a new and improved raking attachment for harvesters of that class in which the rake is made to move or sweep forward and backward over the platform in the arc of a circle. The invention consists in the peculiar means employed for operating or giving motion to the rake, whereby, it is believed, that a very simple, efficient, and durable rake-operating mechanism is obtained, and one which may be driven by a moderate application of power, and economically constructed and applied.]

42,455.—Coal-oil Lamp.—Joshua C. Ambrose, Jersey City, N. J.:

I claim in combination with the burner constructed as shown and composed of the parts, E F G H H2 L and M, the use or employment of the cone, N and N2, fount, B, and chimney, Q R, for the purpose or purposes herein fully described.

42,456.—Picker for Looms.—James Bardsley & Allen W. Gordon, Willimantic, Conn.:

I claim the picker-fastener constructed with a slanting portion, b, and fitted with a set screw, D, operating substantially as herein specified.

[This invention consists in a novel and very simple device for attaching the picker to its staff, which provides for its adjustment to the proper hight, add which strengthens the staff, instead of weakening it like the ordinary mode of attachment.]

42,457.—Japanning Corset Steels, &c.—Charles H. Bassett, Derby, Conn.:

I claim the method, substantially as described, of japanning or coating steels and other articles by dipping them into the japanning solution and withdrawing them, at a velocity less than that at which the japan flows off of the article.

42,458.—Destroying Forts, &c., by means of Inflammable Liquids.—Alfred Berney, Jersey City, N. J. Ante-dated April 19, 1864:

I claim the above-described means of inflicting injury upon an enemy, by employing the liquid referred to, or any equivalent therefor possessing the properties above enumerated, in combination with suitable machinery for projecting the same to a distance, substantially as set forth.

I also claim using only the said crude petroleum, or said oil, or any other inflammable oil, for the purpose specified, after flame has been originated in the manner substantially as set forth.

42,459.—Drum Stove or Radiator.—O. B. Buttles, Milwaukee, Wis.:

I claim the arrangement of the inclined or roof-shaped deflectors in the flue space of a radiating cylinder, for the purpose and in the manner herein described and represented.

42,460.—Corset.—Smith Collins, New Haven, Conn.:

I claim a corset having the diagonal stays, D, arranged relatively to the stays, B C, and the busks, c c, inserted and secured in the manner described, and for the purpose specified.

42,461.—Let-off for Looms.—George Crompton, Worcester, Mass.:

I claim the combination of the tension and friction rollers or bars, and their respective frames, the tension weight, and warp beam, with the warp as described.

The combination of the tension and friction framed levers and rollers, or bars therein, and the tension weight, with friction on the beam head or heads, as described.

The combination of the weighted tension framed lever and roller, or bar therein, with the warp beam, as described, for the purpose of producing tension on the warp and friction on the beam.

Diminishing or increasing the pressure of the tension frame roller or bar, through the warp, upon the friction frame roller or bar, by the tension weight, for the purpose of relieving or holding the friction on the warp beam.

42,462.—Mode of attaching Single-trees.—Peter Conover, Franklin, Ohio:

I claim the combination of the lugs, G G, with the plates, D E, flanges, H H, shaft-bar, A, single tree, B, and king bolt, C, when the said parts are all constructed and arranged and operate in the manner and for the purposes herein specified.

42,463.—Flour-packer.—Isaac Cook, St. Louis, Mo.:

I claim the weighted lever, F, hooked rod, P, and stop, u, in combination with the tappet, v, on the platform, B, and with the sliding box, s, of the driving shaft, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a flour-packer, the spout of which is made of wood, and provided at its bottom end with an auger chamber and auger rotating on a vertical shaft in combination with a rising and falling barrel-platform, which is forced up by a weight, and the strain exerted by this weight on the platform is regulated according to the increasing quantity of flour in the barrel by means of a sliding weight and friction-brake, in such a manner that the flour throughout the whole barrel is compressed with uniform density by the automatic action of the packer.]

42,464.—Apparatus for disinfecting Vessels.—E. Hall Covel, New York City:

I claim disinfecting vessels, chambers, &c., by forcing the highly heated air into and circulating it through them, substantially as herein set forth.

42,465.—Capstan.—Henry Davies, Portsmouth, Ohio:

I claim the pair of rollers, A A, inclined obliquely from the perpendicular in opposite directions, each of the said rollers being provided with a series of parallel latitudinal V-shaped grooves, in the described combination with the spindle, C, wheel, D, and cap, E, all constructed, arranged, and operating in the manner and for the purposes herein specified.

42,466.—Hay-loader.—Wm. H. Elliot, Plattsburgh, N. Y.:

I claim, first, The employment of a crane in combination with a hay-rack and hay-fork, for the purpose herein specified.

Second, The employment of swing cord, t, in combination with a hay-fork when said cord is attached to some fixed point above, and operated in the manner and for the purpose herein set forth.

Third, The employment of swing cord, t, and a hay-fork in combination with a crane the arm of which may be locked at certain points, as and for the purpose herein specified.

Fourth, So constructing the locking devices that they will lock the arm of the crane in certain position while the weight of the fork load is acting upon the swing, t, and will unlock the arm and leave it at liberty to swing around freely, when there is no load upon the fork, as herein set forth.

42,467.—Stave-jointing Machine.—Felix A. Finn, New York City:

I claim the endless chain of beds, substantially as described, in combination with the circular bevelling saw, substantially as and for the purpose set forth.

42,468.—Self-acting Brake.—Willis Glaze, Rochester, Ind.:

I claim the combination of the hook, h, rods, M and K, projection, f, guides, e e, levers, L c c, shaft, J, chains, g g, and whiffle-trees, H H, all constructed, and operating in the manner and for the purpose specified.

[This invention consists in connecting the brake-bar with the whiffle-trees of the vehicle, and also with the breast straps or neck yoke of the team in such a manner that the brakes will be applied to the wheels when the vehicle is passing down or over descending ground, or whenever the speed of the team is checked or "reined in," to stop or retard the movement of the vehicle; and the brakes instantly moved or thrown off from the wheels whenever the draught power of the team is applied to the vehicle.]

42,469.—Apparatus for vaporizing Hydro-carbon Liquids for Illuminating.—Jonathan Griffin, Meriden, Conn.:

I claim the submerged perforated chamber, B, for the purpose of more equally and quickly diffusing the atmospheric air through the whole of the liquid, substantially as and for the purpose described.

I also claim in combination with the submerged perforated chamber, B, the submerged plate, C, to prevent bubbling or agitation of the liquid, substantially as described.

I also claim the interposition of a bright metal condensing plate, C, between the liquid in the apparatus, and the regulator or equalizer for the purpose of collecting and returning the impurities and drip, substantially as herein described and represented.

I also claim in combination with a vaporizing apparatus, a dome or chamber located between the liquid hydro-carbon, and the lights or burners, said dome containing an elastic porous substance that will contract and expand, under the varying force of the passing volume of vapor or vaporized air through it, and thus act as an equalizer of the flow of gas, substantially as described.

42,470.—Smelting Furnace.—Eliphalet Hall, Moriah, N. Y.:

I claim, first, In combination with the furnace, A, the fuel department or oven, B, containing a feeding chain, c, the whole being constructed and arranged to operate substantially in the manner therein set forth.

Second, In combination with the oven, B, constructed with double walls in the manner described, I claim the pipe, E, and tongue, E3, adapted to be employed in connection with a blast of air, to convey the escape heat to the oven, B, for the purpose set forth.

Third, I claim forcing into the smelting furnace, A, the gas eliminated from the wood, and the heated air conveyed from the stack, E, by the employment of the tuyere, E, and pipe, F′, substantially as and for the purposes explained.

42,471.—Breech-loading Fire-arm.—George Hancock, Providence, R. I.:

I claim, first, So hanging the chamber block that it will pratially rotate within the recess in the breech on a fixed pin passing through the lower central portion of said block in combination with the peculiar spring and wedge, n f, substantially as described for the purpose specified.

Second, I claim forming the breech-pin with a bevelled shoulder in continuation with a bevelled surface at the bottom of the chamber, a spring, s, and a projecting nut, w, arranged substantially as described to effect the purpose specified.

42,472.—Skate-fastening.—John Harrar, Philadelphia, Pa.:

I claim the combination of a metallic cylinder, Fig. 3, screw thread, t t, notches, v v, and cavity, c, which were employed instead of the flat plate, shown at Fig. 1, but having a like elongated aperture, d, opening into the cavity, c, will obtain for the said elongated aperture a more ready adjustment, graduation, removal, and require less space, substantially for the purpose described.

42,473.—Crutch.—John Hartman, Jr., Philadelphia, Pa. Ante-dated Dec. 22, 1863:

I claim, first, Constructing and combining with the staff or frame of the crutch, a tube of gutta-percha, or other equivalent substance to form a yielding and easy rest for the arm-pit, substantially as described.

Second, The combination of the tube, A, with the jaws, B B, by means of the conical screws, C C, or their equivalent, substantially in the manner and for the purpose above set forth.

42,474.—Apparatus for arranging and distributing Screw Blanks.—H. A. Harvey, New York City:

I claim an apparatus, substantially such as herein described, whereby blanks deposited in a pan may be arranged and forwarded or supplied to various machines for operating thereon; said apparatus consisting of a pan, a series of vibrating arrangers, and a series of forwarding ways, constructed, combined, and acting together, substantially as herein set forth.

42,475.—Wood Screw.—H. A. Harvey, New York City:

I claim, first, A bulbous-pointed screw, substantially such as is herein described.

Second, A bulbous-pointed screw with the thread projecting unequally, so that its periphery will occupy the same position that it would in a screw of the ordinary form of barrel, substantially as described.

Third, A bulbous-pointed ratchet-headed screw, constructed and having the mode of operation herein set forth.

Fourth, A bulbous-pointed screw provided with a center point, without any thread on the extremity thereof, substantially such as is herein specified.

42,476.—Apparatus for arranging and distributing Screw Blanks.—H. A. Harvey, New York City:

I claim, first, A receptacle having an inclined bottom composed of a series of ribs in combination with a sweep, the two being constructed and operating substantially as described, and constituting an arranging apparatus.

Second, I claim in combination with an arranging apparatus, operating as described, a plate arranged as described for discharging unarranged blanks and preventing them from obstructing the operations of the apparatus, as specified.

Third, In combination with an arranging apparatus constructed and operating substantially as described, I claim an oscillating, receiving, and distributing apparatus acting substantially as set forth.

Fourth, I claim imparting proper motions to an oscillating, distributing apparatus by means of a spring, or its equivalent, an impelling pawl and cams, the whole acting as a combined contrivance substantially as set forth.

Fifth, I claim in combination with an arranging apparatus, substantially such as described, a series of forwarding ways, the combination being and operating substantially as described.

Sixth, I claim mounting an arranging apparatus whose bottom is composed of inclined ribs in such manner, substantially as described, that the inclination thereof may be varied for the purposes described.

Seventh, I claim in combination forwarding ways, or a set or series thereof, an oscillating, receiving, and distributing apparatus and an arranging apparatus, all operating substantially as described, whereby blanks may be arranged and distributed to several machines for performing useful operations thereon, substantially as herein-before set forth.

42,477.—Apparatus for arranging and distributing Screw Blanks.—H. A. Harvey, New York City:

I claim, first, The combination of a pan having the distinguishing characteristics substantially as specified, with revolving sweeps, operating substantially as described.

Second, The combination of a pan and sweeps constituting an arranging apparatus operating substantially as set forth, with a receiving and distributing apparatus having a mode of operation substantially as herein described.

Third, The combination of a set or series of inclined forwarding ways with a receiving and distributing apparatus, the combination operating substantially as described.

Fourth, I claim an arranging mechanism for arranging screw blanks in rows in combination with a distributing apparatus and a set or series of forwarding ways when the combination operates substantially as described, whereby a single arranging apparatus can arrange blanks and forward them to several machines, performing useful operations on the blanks forwarded by said ways.

42,478.—Governor for Steam Engines.—J. L. Hastings, Towanda, Pa.:

I claim resting and supporting the wheel, pulley, or its equivalent, upon the belt that drives the governor, so that if said belt should part, break, or slip off from its pulleys, the dropping of said wheel and its connected arm, will disengage the valve rod from the governor, and thus avoid any injury incident to such casualty, substantially as herein described.

I also claim in combination with the arm, g, and the connecting rod, M, the chain, T, for moving the valve and closing or partially closing the ports when said rod, M, is disconnected from the governor for the purpose of stopping or checking the engine, substantially as described.

42,479.—Floor-cloth.—Samuel Hawksworth, Doncaster, England:

I claim the new manufacture of floor-cloth herein described, composed of a base fabric of consolidated fibrous material and of a surfacing material combined, substantially as set forth.

42,480.—Railroad Chair.—Wells Hendershott, Batavia, N. Y.:

I claim, first, Making a rail chair and coupling for railroads, connected by a hinge or hinges at the bottom, with the inclined planes, b b and f f, so that the pressure and weight of the cars will firmly hold the rails, and when the weight is removed the hold will be relaxed and allow the rails to expand and contract for the purposes described, and in the manner as substantially set forth.

Second, I claim the inclined planes in combination with the hinge, for the purposes described and as set forth.

Third, I claim the hinge connecting the two parts of the chair and coupling for the purposes described, and substantially as set forth.

Fourth, I claim the inclined planes for the purposes described and as set forth.

Fifth, I claim in combination with said rail chair and coupling a rail that may be turned over, with both the top and bottom sides alike.

Sixth, I claim in combination with said rail chair and coupling the supporter for the middle of the rail, constructed in the manner and for the purposes described.

Seventh, I claim the projections, d d, extending below the chair into the opening, c, in the bottom of the box upon which the chair rests, for the purposes described and substantially as set forth.

Eighth, I claim the box, a a, in which the chair or coupling is placed, for the purposes described and substantially as set forth.

42,481.—Churn.—A. E. Hewett, Homer, N. Y.:

I claim the blades, b, attached to the shaft, a, obliquely in pairs and provided with concentric curved slots, c, having their inner sides, c′, inclined, and the upper and lower parts of the blades having chamfered surfaces, d e f, substantially as shown to form a new and improved churn-dasher, as set forth.

I further claim the vertical ribs, i, at the inner side of the churn-box, A, in combination with the rotary dasher, B, for the purpose set forth, constructed and operating as above described.

[This invention relates to a new and useful improvement in the dasher of the churn, which dasher is of the rotary spiral class. The invention has for its object the forcing of the cream in a vertical current downward at or near the edges of the dasher, and upward at the side of the churn-box, the cream at the same time being prevented from rotating with the dasher, and caused to move outward from the dasher shaft, where the dasher has but little effect, to the edges of the dasher, the latter being also so constructed as to admit of being adapted to the weight of the cream in the churn, and capable of being used with great advantage for gathering butter as well as for expeditiously producing the same from the cream.]

42,482.—Sheet Tobacco Press.—Edward Holbrook, Jr., Louisville, Ky.:

I claim, first, The movable walls, A A′, in combination with the upper wall, A, and follower, A2, arranged and operating in any manner substantially as specified.

Second, I claim the rolls, G G, adapted to ascend with the follower, A2, and brace the walls, A′ A′, substantially as and for the purpose set forth.

Third, I claim the combination of the follower, A2, and receiver, F, when employed in connection with the press, A′ A′ A′, as and for the purpose explained.

Fourth, I claim the right and left screws, C C, employed in connection with the crank, D, to open and close the walls, A′ A′, as described.

Fifth. In combination with the follower, A2, I claim the self-adjusting wheels or rollers, a, arranged and operating substantially as and for the purpose set forth.

42,483.—Sheet Tobacco-cutter.—Edward Holbrook, Jr., Louisville, Ky.:

First, I claim the combination with the knife, B, of the rolls, D, D, the latter being covered with felt or analagous material to adapt the knife to be lubricated substantially as and for the purpose set forth.

Second, I claim the combination of the arms, E, crank wheels, F, wheel, G, and gearing H, I, constructed and arranged as herein shown and described, and employed to operate the knife in the manner specified.

Third, I claim the roll, J, employed in connection with the roll, K, for feeding the tobacco to the action of the knife, substantially as set forth.

Fourth, In combination with the cutting apparatus, I claim the cams, M, M, adapted to assist the feeding of the tobacco substantially as described.

Fifth, In combination with the table, A, I claim the wheels or casters, a, arranged and operating substantially as and for the purpose specified.

42,484.—Lump Tobacco-cutter.—Edward Holbrook, Jr., Louisville, Ky.:

First, I claim the roll, C, provided with knives or cutter, c, and operating in connection with the roll, E, substantially as and for the purpose specified.

Second, I claim the lubricating of the knives, c, in manner substantially as herein described and for the purpose set forth.

Third, In combination with the rolls, C E, I claim the inclined slotted table, B′ and roll, F, to prevent the adhesion of the gummy matter of the tobacco, as explained.

42,485.—Lump Tobacco Machine.—Edward Holbrook, Jr., Louisville, Ky.:

First, I claim forming tobacco sheets from the leaves by laying the leaves in flat form between moveable boards or plates and pressing, substantially as set forth.

Second, I claim a feeding table formed in two or more sections, A, A′, arranged at different heights substantially as and for the purpose explained.

Third, I claim the wheels or rollers, a, in combination with the table, A, A′, adapted for use substantially as and for the purposes described.

Fourth, In combination with the aforesaid feeding table, I claim one or more adjustable gauges, E2, employed in the manner described to regulate the introduction of the press.

42,486.—Wringing Machine.—E. S. Howell, Hope, N. J.:

I claim, first, The two wedges, C, C, placed one over the other connected with a lever, F, arranged relatively with the roller, B, and with or without the spring, E, to operate substantially as and for the purpose herein set forth.

Second, The uprights G, G′, beveled at their inner sides and connected to the frame of the frame of the machine as shown, in com-

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bination with the lever, J, all arranged to operate substantially in the manner as and for the purpose herein set forth.

[This invention relates to certain improvements in that class of clothes-wringing machines in which pressure rollers are employed. The invention consists in a novel and improved means for graduating the pressure of the rollers, so that the machine may be readily adapted for wringing different kinds of clothes, and it also consists in an improved means employed for securing the machine to the tub as hereinafter fully set forth.]

42,487.—Stove.—Felix Hoyos, Paris, France. Patented in England, March 16, 1863:

I claim the herein described improved construction arrangement and operation of stoves or fire-grates whereby the air is caused to descend and pass through the fire therein and then upwards and escape through the centre of the stove thus effectually consuming the smoke and rendering the stove available for various useful purposes.

42,488.—Rake for Harvesters.—William H. H. Hunter, Versailles, Ind.:

I claim, first, The combination of screw M, and Nut, O, with shafts, L and K′ by toggle joint in the manner and for the purpose herein described.

Second, Also, the combination of the wrists with their springs, N, N, nut, O, and tubular rake head, P, arranged and operating with the mechanism for tilting the rake teeth, substantially as and for the purpose described.

Third, Also the combination of the stirrup lever, U, with the auxiliary shaft K′, slotted rest A′, gears, b′, and gear wheels on shafts, J, K, arranged connected and operating as described for the purpose set forth.

42,489.—Pipe Wrench.—John Charles Johnson, Oil City, Pa.:

I claim constructing gas tongs substantially as described, by pivoting the hook or movable jaws directly to a nut, screwed into the handle, the upper part of which, above the nut forms the other jaws of the tongs.

Also in combination with the gas tongs constructed as described in the first claim, making the face of the jaw at the end of the handle inclined towards the point of the hook, so as to enable the tongs to be adapted to holding tapering surfaces.

42,490.—Washing Machine.—Josee Johnson, New York City:

I claim the combination of two pounders, E′, E2, and washboards, e, e2, arranged to operate in combination with the vibrating frame, C, and with a suitable tub or vessel, substantially in the manner and for the purpose herein set forth.

42,491.—Molding Artificial Teeth.—Henry D. Justi, Philadelphia, Pa.:

I claim molding the cavities, c, required in the blocks of porcelain teeth and gums by means of cores, b, constructed and applied substantially in the manner described and set forth, for the purpose specified.

I also claim in combination with each of the said cavities, c, the tapering curved projection, e, around the same as described and set forth, for the purpose specified.

42,492.—Lamp.—Martin R. Kenyon, Providence, R. I.:

I claim the combination of the aforesaid hinged cone and chimney holder, the thumb-piece or lifter, S, and the two-coil spring, t, when the whole are constructed arranged and used for the purpose and effect herein described and set forth.

42,493.—Brake Block for Car Brakes.—John P. Swan, Altoona, Pa.:

I claim the construction, arrangement and combination of the block and shoe, with their devices, G E J H and L, as constructed arranged and combined for fastening more securely the brake shoe to the brake block and more easily replacing a worn-out shoe, as herein described.

42,494.—Rudder.—John Lewis, Elizabeth, N. J.:

I claim wings on each side of the rudder acting substantially in the manner and for the purposes specified.

Second, I claim wings attached by hinged or jointed arms for the purposes specified.

Third, I claim attaching the arms of the wings to the rudder by the chains or ropes for the purposes specified.

42,495.—Rolling Angle Iron.—John L. Lewis, Pittsburg, Pa.:

I claim so constructing rolls for rolling angle iron, as that the "pile" constructing the fagot, shall be caught between the rolls flat instead of cornerwise and so rolling as that one half of both sides or wings shall remain in parallel with the face or top of the pile until very nearly reduced to its proper thickness, when by passing it through a plain rectangular groove in said rolls, the wings or sides shall be turned up and finished with the grain conformable to the layers of the original bar.

[This invention consists in the employment or use, in rolling angle iron, of rollers with flat faces and a central triangular ridge or groove in such a manner that the bar from which the angle iron is to be rolled can be introduced between the rollers flat instead of cornerwise, and both sides of the angle iron when finished, run parallel to the layers of the original bar, and not cross-wise as is inevitably the case with one side of angle iron rolled in the ordinary manner.]

42,496.—Chimney Caps.—Thomas A. Mann, West Greenville, Pa.:

I claim the ornamental chimney top as herein described and for the purposes set forth as an article of manufacture.

42,497.—Preparing Mica for making Reflectors, Mirrors, &c.,—William M. Marshall, Philadelphia, Pa.:

I claim the use of mica for the purpose of making reflectors, when it is coated with a metallic surface adhering thereto, or the placing it over any metallic surface used for a reflector for the purpose of protecting it.

42,498.—Raking Attachment to Harvesters.—William G. Merrell, Auburn, N. Y.:

I claim the combination of the slotted crank arm, S, bevel pinion, T, and cam wheel, U, substantially in the manner and for the purposes described.

I also claim providing the cam wheel, U, with the legs, h, in combination with the recess, i, in pinion, T, for the purpose of carrying the cam wheel over the dead points substantially in the manner and for the purposes described.

I also claim the combination of the cam wheel, U, pinion, T, pivoted cam wheel shaft, V, centre shaft, W, and rake arm supporter, X, substantially in the manner and for the purpose described.

I also claim securing the rake head, Z, to the rake arm, Y, by means of pivot-joint plates k and n, having circular bearings, l, and m, and constructed and arranged substantially in the manner and for the purpose described.

I also claim the lug, w, on shaft, W, in combination with the lip on shaft V, substantially as and for the purpose set forth.

I also claim the combination of the adjustable frame, D, with the base plate, C, attached to the platform, A, in the manner shown and described and for the purposes set forth.

42,499.—Stovepipe Elbow.—J. F. Murdock, Wareham, Mass.:

I claim the stove pipe elbow, B, B, made of cast iron substantially as shown and described as a new article of manufacture.

42,500.—Fruit Ladder.—A. W. Olds, Green Oak, Mich.:

I claim the compound braces, F, G, in connection with the universal joint, E, arranged and operating as and for the purpose specified.

Second, I claim the platform, H, rods, I J, and end-pieces, K, L, arranged and operating as set forth.

42,501.—Lime Kiln.—C. D. Page, Grand Rapids, Mich.:

I claim the herein-described fire chambers, G G, with spiral flues, which are so arranged upon each side of the cupola, that the flame is caused to penetrate every part of the interior in a spiral curve, as and for the purpose specified.

Second, I claim the drop slide, E, for discharging the burnt lime stone, and keeping the cupola tightly closed when not being discharged, the same being constructed, arranged and operating as and for the purpose specified.

Third, I claim the car, F, in combination with the drop slide and kiln, arranged and operating as set forth.

42,502.—Sewing Machine.—Charles Parham, Philadelphia, Pa.:

I claim, first, the looper, u, constructed and operating in connection with the needle and shuttle thead substantially as herein described and represented to form a button-hole stitch.

I also claim a gate or cut-off, placed in the race of the machine, for shutting off the shuttle from the needle-loop, to prevent the former from passing through the loop of the latter, at every alternate throw substantially as and for the purpose described.

I also claim the opening of the gate or cut-off by the action of the hook whilst it is closed by a separate mechanism substantially as described.

I also claim in combination with the looper, the wheel, z, with its ratchet and elevations and depressions for operating and holding at intervals said looper, substantially as described.

I also claim hanging the feed wheel in a pivoted frame, so that the wheel and frame may be moved towards and from the needle or sewing line, to form a button-hole, substantially as described.

I also claim in combination with the feed wheel and its pivoted frame, the rod, B′, and spring, p, for giving them their lateral and adjustable movement or for suspending their movement substantially as described.

I also claim in combination with the feed wheel and its pivoted frame susceptible of a lateral movement towards and from the needle or sewing line, an independent mechanism such as described for turning said feed wheel at stated intervals, upon its journals or axle to feed the material along substantially as described.

I also claim a rotary feed wheel that has two motions communicated to it at one and the same time, viz., a rotary motion around its axis and a laterally reciprocating motion around a pivoted point substantially as and for the purpose herein described.

I also claim the arrangement of the gears, G, H, and double cam I, so that there shall be two actions of the needle to one action of the lateral feed, and for getting the correct time and movements of the lateral feed, as herein described and represented.

42,503.—Windwheel Pump.—Edward Pepple, New Carlisle, Ind.:

I claim the combination and arrangement of the shaft, D, wheel, M, brake arm, P, and brake, N, in the manner and for the purpose set forth.

I also claim the general arrangement of the pump and wind wheel, substantially as described.

42,504.—Machine for cutting Tapering Forms.—Luther E. Philips, Bristol, N. Y.:

I claim the conical tube, c, when constructed with strengthening and balancing bars, d, in combination with the arrangement of the feeding carriage, H, and its holding device when constructed to operate as and for the purpose substantially as set forth.

42,505.—Sawing Machine.—Charles L. Pierce, Buffalo, N. Y.:

I claim the compound friction wheel, R K′, shaft, L, and pinion, L′, in combination with the friction wheel, N, shaft, N′, pulley, P, and shifting lever, O, for the purposes substantially as described.

Second, The planks, F, F′, connected together by the arched standards, G, G′, which planks and standards form a movable table for carrying the shingle block to the saw, substantially as described.

Third, The dog, Q, R, supported and operated upon the cross-piece, H, for the purposes and substantially as set forth.

42,506.—Harvester.—James Pine, Troy, N. Y.:

I claim, first, The two driving wheels, B D, of different diameters connected with the main frame, A, as shown and connected by suitable gearing with a shaft, C, on said frame, substantially as and for the purpose herein set forth.

Second, The bar, F, and finger bar, J, connected together by a joint, j, as shown and the former attached to the pendant, g, of the frame, A, by a joint, f, in combination with the two driving wheels, B D, and the frame, A, all constructed and arranged in the manner and for the purposes set forth.

42,507.—Ivory-covered Books.—Julius H. Pratt, New York City:

I claim, first, Applying seamless or unbroken sheets of scroll-cut ivory to the mill-board covers of books, in combination with the clamping binding, e e, substantially as and for the purposes described.

Second, I claim the scroll-cutting and binding processes combined, substantially as and for the purposes described.

Third, I claim the method substantially as set forth, of manufacturing seamless covers for books from scroll-cut ivory.

Fourth, I claim as a new article of manufacture, a seamless scroll-cut ivory covered book, substantially as described.

42,508.—Apps for making Brush Hats.—J. C. Raake, Brooklyn, N. Y.:

I claim a brushing mechanism constructed substantially as described and operating in hot water in the manner and for the purpose set forth.

42,509.—Pneumatic Railway.—Thomas Webster Rammell, London, England. Patented in England on Feb. 10, 1860:

I claim, first, A pneumatic railway or tube in which the carriages are placed inside the tunnel or tube, but are independent of the tunnel or tube, and are wholly supported and in their motion are guided and directed by two or more rails, grooves, or trams, and in which the pneumatic pressure is applied over the whole or transverse area of the carriage.

Second, The contrivance for filling up with soft material the space between the interior of the tunnel or tube and the outside of the carriage as applied to pneumatic railways and tubes, as above described.

Third, The use of several smaller or branch air passages leading into the tube at different points, either with or without self-acting valves, so as gradually to reduce the velocity of the carriage as applied to pneumatic railways and tubes, as above described.

42,510.—Fluted Ruffles.—Thomas Robjohn, New York City:

I claim a fluted ruffle in which the flutes are rotained in place without the use of an adhesion thread by pressing them flat along any portion of the width of the ruffle, substantially as herein specified.

42,511.—Stirrup.—Cyrus W. Saladée, Paducah, Ky.:

I claim the combination and arrangement of the stirrup, A, guard, B, toe-piece, C, screw, D, and shoulder plate, E, the whole being constructed, arranged, and operating in the manner hereinbefore specified.

42,512.—Stirrup.—Cyrus W. Saladée, Paducah, Ky.:

As a new article of manufacture I claim the guard, B, constructed, operating, and attached substantially as set forth.

42,513.—Cultivator.—S. W. Slocumb & E. Phillips, Fulton City, Ill.:

I claim, first, The stirrups, h h, arranged as herein described and employed to enable the operator to move the inner plows laterally and independently by the direct application of his feet, as specified.

Second, In combination with the loosely shackled standards, F F′ F* F′*, constructed and arranged as herein described, the chains, a a′ a* a′* b b′, eye-bolts, H H′ H* H′*, and thumb-nuts, a2, as and for the purpose set forth.

[This invention relates to an improvement in that class of cultivators which straddle the rows and pass over the growing plants, the shovels being so arranged that they can be readily adjusted to cut deeper or thallower, or that they can be thrown out of the ground at pleasure.]

42,514.—Cultivator.—J. D. Smith, Peoria, Ill.:

I claim the combination of the carriage swinging frame, b b, driver's seat, A, hinged shovel carrying frame, d, vibrating shovel standards, g g, (connected to rock-shafts), stop-pins, p p, adjusting chain, n, when the frame, d, with the shovels is entirely forward of the axle of the frame, b b, and the standards of the shovels are connected together at their upper extended ends by an adjustable bar, h, and operated by the single pivoted handle, C, from the driver's seat; all in the manner and for the purpose herein described.

Second, The arrangement of the rear wheeled frame, b b, front cultivator frame, d, seat, A, shovels, g, rock-shafts, g′ g′, bar, h, lever, C, stop-pins, p p, chain, n, tongue, B, and oblique laterally adjustable guards, D D, all for united use in a machine adapted for cultivating growing crops, as set forth.

Third, The arrangement of the chain connection, n, stop-pins, p p, in combination with the hinged forward shovel frame, and the rear wheeled frame, when the said frames are constructed and operated in the manner herein described, and all adapted for the purpose set forth.

42,515.—Artificial Arm.—Edward Spellerberg, Philadelphia, Pa.:

I claim, first, The described method of actuating the hand mechanism by a pressure pad, attached to the inner side of the arm beneath the shoulder joint, and deriving its action from pressure of the upper arm against the side, substantially as and for the purpose specified.

Second, The employment of a bell-crank, M, at the elbow-joint, for transmitting motion from the pad to the hand mechanism and *vice-versa;* the fulcrum pin or pins, l, of said bell-crank being confined in slots, m, in the elbow-piece, B, the whole operating substantially in the manner and for the purpose set forth.

Third, I claim disconnecting the pressure pad from the hand mechanism by means of the latch, r, operating as described, or in any manner equivalent thereto, for the purpose set forth.

42,516.—Exercising Machine.—Charles F. Taylor, New York City:

I claim the sliding bars, B B, connected with weights or their equivalents to offer a resistance to the action of the feet of the patient, in combination with a couch or lounge, A, all arranged to operate in the manner substantially as and for the purpose herein set forth.

42,517.—Lacing Shoes.—Charles F. Spencer, Rochester, N. Y.:

I claim the combination of a lacing cord or cords, E, with bearings, D D, or equivalent, and the sides, C C, of the slit, B, of a shoe, said cord or cords passing alternately from side to side around the bearings, and closing the slit by a single drawing action at the top, substantially as herein set forth.

I also claim the construction and arrangement of the stem, a, sheare, b, and shoulders or flanges, c c′, when the same are combined with the leather, C, in such a manner as to allow the sheare a free turning action, and to secure the device firmly to the leather, as herein specified.

42,518.—Portable Piano-forte.—Maurice Vergnes, New York City:

I claim, first, Producing the tone of a sonorous body by the stroke of a hammer thrown by its momentum, in the manner described.

Second, Attaching the damper firmly to the key in the manner described.

42,519.—Car Spring.—Ulysses B. Vidal, Philadelphia, Pa.:

I claim the arrangement of the pyramidal springs, B B′, to stand in alternate inverted positions, in the manner and for the purpose herein shown and described.

I also claim having one side of the box divided into as many separate movable parts, A′ A″, as there are tiers of springs, as and for the purpose herein shown and described.

42,520.—Lantern-guard.—Wm. Westlake, Milwaukie, Wis.:

I claim attaching the lantern-guard to the lantern so that as a whole, and without any hinging or separating of its parts, it may readily and speedily be removed from the lantern, substantially as herein set forth.

42,521.—Raking Attachment to Harvesters.—Cyrenus Wheeler, Jr., Poplar Ridge, N. Y.:

I claim in combination with a platform having a hinged connection with the main frame so connecting the rake to vibrating plate, G, and mounting it on plate, I′, rigidly connected to the main frame, that the rake in sweeping across the platform shall follow its surface and deliver the grain in the rear of the main frame, and in a position nearly at right angles to that in which it falls upon the platform, substantially as described.

I also claim in combination with the rake; spring, Q, and chain, Z, so arranged as to give the rake increased force as it falls, and hold it firmly to the platform during the first part of its sweep, substantially as described.

I also claim in combination with the catch-piece, b′, for sustaining the rake when elevated, the stop, R, controlled by the operator for releasing rake at pleasure, substantially as described.

I also claim the combination and arrangement of the self-acting devices for throwing the rake out of gear and stopping it in an elevated position, after removing the grain, substantially as described.

I also claim the combination of the device for stopping the movements of the rake, with the devices for releasing the catch-piece, b′, which supports the rake when elevated and so arranged as to be under the control of the operator, substantially as described.

42,522.—Stove-cover Lifter.—Joseph P. Williams, Somerville, Mass.:

I claim the combination of the perforated insulator, C, with the handle, B, and the prong, A, the same being arranged and constructed substantially as described.

I also claim the combination of the perforated insulator, C, with the handle, B, the prong, A, and the shank or screw-rod, f, or its equivalent, the whole being arranged as specified.

I also claim the prong as channelled or grooved, and made with the lateral opening or passage, the same being as explained.

42,523.—Device for operating Blinds.—Oren Williams, Governeur, N. Y.:

I claim the semispherical socket, a, provided with teeth, a′, and the screw, b, attached to the shaft, E, or other equivalent gearing for turning the blind, the pinion, G, on said shaft and the lever, H, attached at one end to the slat rod, I, of the blind, B, and provided at its opposite end with a segment rack, p, with which the pinion, G, gears the shaft, D E, being connected and disconnected and the pinion, G, connected with and disconnected from the shaft, E, as shown and all arranged to operate substantially as and for the purpose specified.

[This invention consists in having the lever hinge of the blind formed of a semispherical socket provided with an internal gear into which a screw mashes or works, the screw being on a shaft which is fitted in a tubular shaft, the latter passing horizontally through the jamb of the window-frame and having a pinion upon it which gears into a segment rack at one end of a lever, the latter being attached to the slat rod of the blind, and all arranged in such a manner that the blind may be opened and closed from the inner side of the window without raising the sash, and the blind slats also opened and closed.

42,524.—Photographic Camera.—Thomas E. Wood, Boston, Mass.:

I claim the construction of a thin piece of board, square or otherwise, with a circular or other opening for the purpose of admitting the lens or tube in which said board are cut two vertical dove-tailed notches, inserted in which dove-tailed notches are two vertical bars, which said vertical bars are fastened at top and bottom to two horizontal bars or pieces tongued, and inserted in grooves so as to work or slide freely; said bars and board being so arranged as to be moved by means of pinions and racks in a continuous vertical or horizontal direction.

42,525.—Friction Clutch.—James S. Brown, Pawtucket, R. I., assignor to Joseph R. Brown & Lucian Sharpe, Providence, R. I.:

I claim the combination and arrangement of the segments, E E, the segment-plate, D, and levers, G G, with the wedge collar, F, and pulley, P, substantially as described for the purpose specified.

42,526.—Locomotive and Furnace Grates.—Myron E. Brown (assignor to himself and Frank O. Drullard and Amy C. Hubbard), Buffalo, N. Y.:

I claim the perforated dumping plate in combination with the oscillating grate, when the plate is placed in front of and transversely to the grate, substantially as described and for the purposes set forth.

42,527.—Direct-acting Engine.—Abraham Campbell & Charles B. Hardick (assignors to themselves and Albert B. Campbell), Brooklyn, N. Y.:

We claim the arrangement of the levers, i, link, k, and connecting rod, m, to the crank of the fly-wheel shaft, for the purposes and as specified,

We also claim the boxes, 2 2, fitted in and forced together by the tapering jaws and confined by the screw, 8, for the purposes and as specified.

42,528.—Cider Press.—Orlando Clarke (assignor to himself and Isaac Utter), Rockford, Ill.:

I claim the sectional curb or hoop, D, when fastened and released by the eccentric, and constructed, arranged, and operating substantially in the manner and for the purpose described.

42,529.—Breech-loading Fire-arm.—Jarvis Davis (assignor to Patrick Smith), Buffalo, N. Y.:

I claim the spring, A, constructed and operating upon the hinged abutment, F, substantially as herein described.

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42,530.—Relief Printing Plates.—Benjamin Day, Hoboken, N. J., assignor to W. G. Lord, C. Ponomareff & J. S. Talbot, New York City :

I claim preparing a surface of chalk, clay, or similar material with an ink that does not penetrate but adheres to the said surface and protects the same while brushed or rubbed for producing a relief printing surface, as specified.

42,531.—Machine for punching and cutting Metal.—Nicholas de Telescheff, St. Petersburg, Russia, assignor to Ezra Jenks, London, England. British Patent dated Jan. 24, 1863 :

I claim the application to the construction of punching and cutting machinery, of the levers, f f′, in combination with the slide bars, d e, and the screw, i i′, the whole arranged and operated in connection with the auxiliary mechanism, in manner substantially as herein set forth.

42,532.—Harvester.—John H. Elward (assignor to himself and W. H. Cushman), Ottawa, Ill.:

I claim the application to harvesting machines of hinged finger-bar bent at right angles in which the horizontal part constitutes the finger-bar proper, while the vertical part serves the purpose of a lever and reel-stand, substantially in the manner and for the purposes described.

I also claim in combination with a bent finger-bar herein described, the shoe, F, when constructed with the rear flange, B′, and with the standards, G′, and bottom-plate, F, substantially in the manner herein described.

I also claim the method herein described of raising the inner end of the finger-bar within the standards, G′, of the shoe, F′, for the purpose of adjusting its position as well as to give it free play in passing over obstructions, substantially as herein described.

I also claim the application to harvesting machines of lozenged shaped hollow sickles blades having cutting edges at their front and rear, and provided with inner cutting edges, substantially in the manner herein described.

I also claim in combination with the hollow lozenge shaped cutter blades attached to the vibrating sickle bar, similar formed sickle blades attached to a stationary sickle bar, substantially in the manner and for the purpose set forth.

I also claim in combination with the vibrating and stationary sickle bars and sickles herein described, the guard-finger, n, closed at the top and having a hollow space at the lower part for the escape of the grass or other material which might choke the cutters, substantially in the manner herein described.

I also claim the screws, d, in combination with the flanges, e, of the shoe, L, and the finger-bar, D, for raising the outer end of the finger-bar, substantially in the manner herein described.

I also claim in combination with the shoe, F, substantially as herein described, the arms, G, and bracket, H, for the purpose of securing and adjusting the same to the frame, substantially in the manner and for the purposes herein described.

42,533.—Fabric manufactured from Caoutchouc, &c.—Oscar Falke and Philip Scrag, New York City, assignor to themselves and Thos. A. Jenckes, Providence, R. I. :

The new manufacture or substance hereinabove described, and possessing the substantial properties herein described, and composed of india-rubber, gutta-percha or other vulcanized gum and sulphur, in the proportions substantially such as described, and when incorporated, subjected to a high degree of heat, as set forth, and whether other ingredients be or be not used in the preparation of the manufacture, as herein described.

42,534.—Lamp.—Caleb Goodwin (assignor to himself and J. C. W. Bailey), Chicago, Ill.:

I claim, first, The wick tube, B, either corrugated or otherwise, so constructed as to admit of sundry air passages extending from its lower part to the top, and discharging the air immediately at the base of the flame, substantially as and for the purposes set forth.

Second, The combination and arrangement of the wick tube, B, the open burners, C, and the cone, A, when constructed and operating substantially as and for the purpose herein described.

42,535.—Portable Baker.—J. H. Jackson, U.S.A., assignor to himself and Mahlon M. Wombaugh, Cincinnati, Ohio :

I claim the portable cooker and mess kit, composed of the exterior pan, A, having ears, D D′ B B′, for convenient suspension and for attachment of a cover, F E E′, the interior pan, G, insulated from the pan, A, by projections, H H′ H″, I I′ I″, and the interior elevated cover or canopy, J, the whole being combined and operating in the manner set forth.

42,536.—Fountain Pen.—G. J. Nolty (assignor to himself and D. Robertson), New York City :

I claim a fountain pen provided with a movable plug, C, which has a central channel, c, and groove, f, and works in the socket, B, against the partition, b, which is provided with a hole, e, substantially in the manner herein specified, so that by turning the plug in the socket the supply of ink in the pen can be regulated.

42,537.—Shoe-knife.—S. Richard (assignor to himself and W. C. Barnes), Southbridge, Mass. :

I claim the improved form of knife blade substantially as shown and described.

I also claim the manner of confining the knife to the handle and allowing it to be adjusted or removed by means of the slotted shank, as set forth.

42,538.—Feed-water Heater.—John R. Sees, New York City, assignor to W. F. Weaver, Philadelphia, Pa. :

I claim the corrugated diaphragm feed-water heater attached in the manner and for the purposes herein set forth.

42,539.—Feed-water Heater for Locomotives.—John R. Sees, New York City, assignor to Wm. F. Weaver, Philadelphia, Pa. :

I claim surrounding portions of the feed-water heater with the annular bands, as and for the purposes herein set forth.

42,540.—Steam Gage.—John R. Sees, New York City, assignor to Wm. F. Weaver, Philadelphia, Pa. :

I claim, first, Constructing the steam or pressure chamber of the gage of the disks, said steam space or pressure chamber being free from solid substances therein, and the lever on the upper end thereof having both of its ends free, the parts being arranged substantially in the manner and operating as herein set forth.

Second, I claim the arrangement of the lever, i, and the other devices, as herein recited, for communicating and indicating the pressure.

Third, I claim the plate, t, and its arm, u, for adjusting the gage to high or low pressures.

42,541.—Check Valve.—John R. Sees, New York City, assignor to Wm. F. Weaver, Philadelphia, Pa. :

I claim the valve, g, with recessed ends, h and i, and with a groove or depression, j, and susceptible of being operated substantially as herein set forth.

And I further claim, in combination with a check valve constructed as herein described, the movable seat for the purposes herein recited.

42,542.—Breech-loading Fire-arm.—Isaac Smith (assignor to himself, C. B. Debaren and John B. Morrell), New York City :

I claim, first, The safety bolt, D, arranged as described, to work transversely to the hammer and operated by means of an eccentric wrist, f, on the rear end of the pin, b, of the breech-piece, substantially as herein specified.

Second, The cartridge-extractor, E, swinging horizontally about a pin, g, furnished with a tooth, j, and actuated by means of a hook, k, which is combined with a transversely swinging breech-piece, the whole arranged and operating substantially as herein specified.

[This invention consists in a novel mode of applying a safety bolt in combination with the movable breech-piece of a breech-loading fire-arm, for the purpose of preventing the hammer from coming down and firing the cartridge while the breech-piece is open. It also consists in a certain novel arrangement of an extractor for extracting discharged metallic cartridge shells from the barrel of a breech-loading fire-arm, and certain novel and simple means of operating the same.]

42,543.—Fastening for Flasks or Molds.—Orrin H. Burdick (assignor to himself and D. M. Osborne, Auburn, N. Y. :

I claim, first, Making the part, E, of a two-part fastening for flasks, convex, substantially as and for the purpose described.

Second, In combination with the two parts, E and D, the recess in the one and the corresponding tongue in the other, substantially as and for the purpose described.

Third and lastly, The combination of the tongue, the corresponding recess and the key or pin for locking and holding together the different parts of a flask, substantially as and for the purposes described.

42,544.—Boot-leg Stiffener.—Nathaniel Gear, Indianapolis, Ind. :

I claim the application of jointed metallic bars or stiffeners to the legs of boots, so as to keep them up and prevent them from wrinkling, whilst they are free to conform to the joints of the wearer, making them very comfortable and easy, and avoiding chafing of the feet, substantially as described.

RE-ISSUES.

1,658.—Design for Back Combs.—Elias Brown (assignee of Abel Gray), Wappinger's Falls, N. Y. Patented Jan. 24, 1860 :

I claim the ornamental design for a comb, herein shown and described, which consists substantially in providing the upper part of the comb frame with a series or string of spherically-shaped projections or balls of gradually-diminishing diameter from the center toward the edges of the comb, as set forth.

1,659.—Flour-packer.—Nathan Kinman, Cambria, N. Y. Patented Oct. 30, 1864. Extended —— ——.

I claim, first, The packing of flour by means of inclined blades or spiral scrolls, substantially in the manner and for the purposes set forth.

Second. I claim the spout, b, conjointly with the blades, h, or spiral scrolls for directing the flour into the barrel and for holding the flour whilst the barrel is removed, substantially as set forth.

Third, I claim the hollow shaft, g, for the escape of the air as it is expelled from the barrel in packing flour.

Fourth, I claim the self-acting clutch in combination with the packing apparatus, in the manner above set forth.

1,660.—Eraser and Pencil-sharpener.—A. G. Shaver, New Haven, Conn. Patented March 8, 1859. Reissued Aug. 30, 1859 :

I claim, first, An eraser with a convex or burnishing back, substantially as and for the purpose set forth.

Second, The application of one or more cutting edges, D, to the shank of an eraser.

Third, The serrated or file groove, E, for the purpose herein shown and described.

[This invention consists in giving to one side of the eraser a convex form in such a manner that the same can be conveniently used as a burnisher or polisher; it consists, further, in combining with this curved or waved eraser a pencil sharpener, by forming a cutting edge on one or both sides of the shank thereof. And it consists, finally, in the application to the surface of the blade or shank of the eraser of a serrated or roughened groove, for the purpose of finishing the point of the pencil, or sharpening it after the wood has been cut away.]

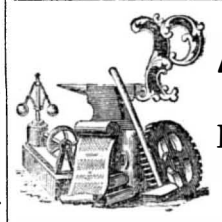
1,661.—Tooth-pick.—Benj. F. Sturtevant, Boston, Mass. Patented June 2, 1863 :

I claim as a new article of manufacture, a machine-made tooth-pick cut from a band or strip, in such a manner that the form of the pick one way corresponds with the cross-section of the band, while its form the other way is determined by the shape of the cutter or cutters, and movement given to the strip or to both.

I also claim making tooth-picks with bevels or chamfers at the opposite ends of each, from a blank or band chamfered at its opposite edges, substantially as specified.

DESIGN.

1,932.—Trade-mark.—Theodore Thurber, Auburn, N. Y.



PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents :—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

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SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

D. A. W., of Pa.—If you will read "stables" instead of "tables," you will have a correct solution to your inquiry about Hercules.

N. W., of Ohio.—The simplest plan that we know of for determining the quantity of carbonic acid in any specimen of air is to pass the air through lime-water, when the carbonic acid enters into combination with the lime, and is precipitated in the form of carbonate of lime. Whether a simple plan can be devised remains to be seen.

J. O. B., of Mo.—Your suggestion to run the Atlantic telegraph through the higher latitudes so as to have shorter sea stretches has been very fully considered. Some of our best electricians are of opinion that the resistance of 3,000 miles of wire will be too great for any insulating coating which it is proposed to use, and that consequently the cable will not last long.

L. M., of Mass.—Perhaps our readers have had enough of the metrical system for the present.

H. B., of N. Y.—You will find illustrations of spectroscopes on pages 20 and 229, of Vol. V., new series, SCIENTIFIC AMERICAN. We are not aware that the facts of this new science have yet been collected in any book.

A. E., of Mich.—We know of no paper exclusively for telegraphers. The SCIENTIFIC AMERICAN aims to publish every thing new in the progress of this thaumaturgic art.

F. G., of N. Y.—A water-tight cement is made by mixing equal parts of red and white lead with sufficient boiled linseed oil to make a paste.

W. H. N., of Pa.—The best article on inks that we know of is in "Ure's Dictionary of Arts and Sciences." For receipts see Vol. IX., new series, SCIENTIFIC AMERICAN.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, April 27, 1864, to Wednesday, May 4, 1864 :—

D. H., of N. Y., $25; A. S., of N. Y., $20; P. B., of N. Y., $20; R. S. C., of N. Y., $41; J. A. K., of Mo., $20; T. O., of Mass., $20; R. & Y., of N. Y., $69; I. C. C., of Ohio, $20; J. M., of N. Y., $20; W. C. S., of N. Y., $20; G. E. H., of Maine, $20; G. R. H., of Mo., $20; E. C. A., of N. Y., $10; D. M., of N. Y., $45; W. C. E., of N. J., $16; S. L. K., of N. Y., $16; J. A. H., of Wis., $22; J. L. & Co., of Iowa, $432; D. & D., of Ohio, $25; E. H. M., of N. Y., $25; S. S. J., of Ohio, $16; A. B., of Ill., $30; F. & M., of Mich., $16; T. J. B., of Tenn., $20; J. B. K., of Ill., $25; E. B. C., of R. I., $25; J. McC., of Ohio, $15; E. S. A., of Ill., $25; G. I., of Pa., $16; R. G., of Mo., $30; C. & W., of N. Y., $16; H. & F. J. L. B., of Ohio, $50; C. E. S., of Iowa, $16; W. N. B., of Ind., $10; D. R. M., of N. Y., $25; M. W. B., of N. Y., $16; T. C., of Conn., $45; D. & J. S., of Pa., $20; R. B. L., of Ohio, $20; R. W. J. of N. Y., $31; D. E. H., of Mass., $20; W. O., of Mass., $20; C. A. C of N. Y., $20; R. R., of N. Y., $46; A. D., of N. Y., $16; A. H. G., of N. J., $20; A. P., of Wis., $30; A. J. B., of N. Y., $16; A. B., of N. J., $15; B. F. T., of Mich., $20; H. B. M., of Mich., $16; G. E. R., of N. Y., $16; C. T. F., of N. Y., $28; T. B. McC., of Del., $25; F. G. F., of Ill., $25; W. M., of Mass., $28; L. H., of Cal., $16; C. H. S., of Me., $25; G. H. M., of Ohio, $26; E. S., of N. Y., $16; W. W. L., of Ill., $16; J. J. R., of Ohio, $11; W. J. W., of Ohio, $16; E. T., of Pa., $16; J. B. W., of N. J., $11; A. S., of N. Y., $16; S. J. M., of N. Y., $265; A. R., of N. Y., $44; Z. S. S., of N. Y., $25; H. W. K., of N. Y., $20; J. T., of N. Y., $16; J. G., of N. Y., $20; C. H. B., of N. Y., $41; E. M., of Conn., $20; M. G., of N. J., $16; F. J. B. H., of N. Y., $16; P. S. B., of N. Y., $20; H. P., of Vt., $20; E. R. C., of N. J., $20; C. B., of N. Y., $20; P. E., of N. Y., $20; W. F., of Conn., $20; J. A. D., of N. Y., $45; H. W., of N. Y., $25; J. L. W., of N. Y., $25; B. F. M., of Wis., $26; W. S. N., of Mass., $25; G. D., of Conn., $16; I. N. S., of Ill., $25; S. & T., of Ohio, $21; C. A. M., of Ill., $15; B. F. C., of Mich., $16; A. R., of Iowa, $25; T. C. L., of Mass., $28; W. H. S., of Conn., $25; D. K., of Pa., $21; H. B. W., of Iowa, $16; S. S. H., of Maine, $16; J. H. B., of N. J., $41; S. G., of N. J., $16; D. K., of Pa., $15; J. W., of N. Y., $33; A. W. T., of Ill., $20; C. M., of N. Y., $25; E. L. W., of Pa., $15; C. S. B., of Mass., $16; J. T. L., of N. Y., $16; E. C. A., of N. Y., $12; J. S., of N. Y., $474; C. G. H., of Kansas, $28; D. F. W., of Mo., $16; H. & B., of Conn., $25; B. M. B., of N. Y., $25; A. B., of N. J., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, April 27, 1864, to Wednesday, May 4, 1864 :—

D. H., of N. Y.; D. R. M., of N. Y.; Z. S. S., of N. Y.; J. A. M., of N. Y.; G. DeM., of N. Y.; H. & F. J. L. B., of Ohio (2 cases); C. W. B., of Conn.; W. M., of Mass.; P. C. C., of Cal.; B. F. C., of Mich.; G. H. M., of Ohio; H. L., of Mich.; H. W., of N. Y.; F. G. F., of Ill.; J. B. K., of Ill.; I. N. S., of Ill.; W. G. N., of Mo.; J. L. W., of N. Y.; A. R., of Iowa; C. H. S., of Mass.; S. & T., of Ohio; J. J. R., of Ohio; J. G., of Pa.; D. & D., of Ohio; T. C. L., of Conn.; T. B. McC., of Del.; L. H., of Cal.; E. H. M., of Cal.; B. F. M., of Ill.; C. T. F., of N. Y.; D. K., of Pa.; E. G. A., of Ill.; E. B. C., of R. I.; J. H. B., of Pa.; R. & Y., of N. Y.; R. R., of N. Y.; C. H. B., of N. Y.; J. S., of N. Y. (7 cases); J. W., of N. Y.; R. S. C., of N. Y.; C. N., of N. Y.; C. G. H., of Kansas; S. Z. H., of N. J.; H. & B., of Conn.; D. C. & L. G. R., of Nebraska; C. M., of N. Y.; W. H. S., of Conn.; B. M. B., of N. Y.; A. B., of N. J.; E. C. A., of N. Y.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

ORDNANCE OFFICE.

WAR DEPARTMENT,
WASHINGTON, May 1, 1864.

SEALED PROPOSALS will be received at this office until Monday, the 23d day of May, 1864, for the delivery at the following arsenals, Cavalry Accoutrements, United States Cavalry pattern, as hereinafter specified.

At the New York Arsenal, 25,000 sets.
At the St. Louis Arsenal, 5,000 sets.
At the Frankfort Arsenal, 10,000 sets.
At the Alleghany Arsenal, 10,000 sets.

These Accoutrements are to be made in strict conformity with the regulation pattern, which can be seen at the above named places. Each set is to consist of one Sabre-belt and plate complete; one Carbine-sling with swivel complete; one Sabre-knot; one Carbine Cartridge-box; one Pistol Cartridge-box or Pouch; one Belt-holster for Army size revolver, and one Cap-pouch with cone pick. All of which are to be made of the best materials and workmanship. The Sabre-belt, Sabre-knot, and Carbine-sling are to be of Buff Leather Blacked, and the Cartridge-boxes, Belt-holster, and Cap-pouch of Pure Oak Tanned Leather.

It is to be distinctly understood that this Department is to have the privilege of inspecting the work done under any contract it may award, in all stages of its progress; especially, to examine the stock before cutting. They are to be subject to the final inspection at the Arsenal, where delivered, before being received by the Government. None are to be accepted or paid for but such as are approved upon inspection.

Deliveries must be made in lots of not less than one-tenth (1-10th) per week of the whole number contracted for; the first delivery to be made on the 20th day of June.

Failure to make deliveries at a specified time will subject the contractor to a forfeiture of the number he may fail to deliver at that time.

The Accoutrements must be boxed in the usual manner; the boxes to be charged cost, to be determined by the inspector.

Bidders will state explicitly the Arsenal, or Arsenals, where they propose to deliver, and the number of sets they propose to deliver at each place, if for more than one.

No bids will be considered from parties other than regular manufacturers, and such as are known to this Department to be fully competent to execute in their own shops the work proposed for. Should any party obtaining a contract offer Accoutrements other than those made in his own shops, they will be rejected, and the contract rendered null and void.

Bidders will enclose with their bids the written acknowledgments of their sureties over their own signatures.

Each party obtaining a contract will be obliged to enter into bond with approved sureties for its faithful execution.

Upon the award being made, successful bidders will be notified, and furnished with forms of contract and bonds.

The Department reserves the right to reject any or all bids if not deemed satisfactory.

Proposals will be addressed to "Brigadier-General George D. Ramsay, Chief of Ordnance, Washington, D. C.," endorsed "Proposals for Cavalry Accoutrements."

GEORGE D. RAMSAY,
20 3 Brigadier-General, Chief of Ordnance.

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WINANS' ANTI-INCRUSTATION POWDER effectually cleanses dirty Boilers without injury or loss of time. A thousand references. Send for circular to H. N. WINANS', 11 Wall street, New York. 20 4*

THE COLD-IRON BAR CUTTERS ARE INVALUABLE in Machine Shops. They will cut off four inch, round or square bars. For circulars or machines address CRESSON & HUBBARD, 1,509 Pennsylvania avenue, Philadelphia. 0 5*

FOR GRAY & WOOD'S, WOODWORTH, AND DANIEL Planers, address J. A. FAY & CO., Worcester, Mass. 1

WANTED.—TO PURCHASE TWO SECOND-HAND LATHES. One to swing from 30 to 36, bed 16 to 22 feet; the other swing 12 to 16; 4 to 6 feet bed, with or without screw-cutting gear. Address LOCKWOOD BROOKS, Tatham's Lead Works, 82 Beekman street, New York. 1*

PATENT COMMISSION HOUSE, SNYDER & WALTER, 229 Broadway, New York. Valuable Patent Rights sold for cash on commission. Consignments respectfully solicited. Address SNYDER & WALTER, 229 Broadway, New York Refer to H. D. Smith, Chemical Bank, New York: Sheppard Seward & Co., 214 Pearl street, New York; and John McKewan, Importer, 55 Maiden Lane, New York. 1

BAIRD'S PRACTICAL AND SCIENTIFIC BOOKS.

THE PRACTICAL METAL-WORKER'S ASSISTANT; comprising Metallurgic Chemistry, and the Arts of Working all Metals and Alloys; Forging of Iron and Steel, Hardening and Tempering, Melting and Mixing, Casting and Founding, Works in Sheet Metal, the Processes dependent on the Ductility of the Metals; Soldering and the most Improved Processes, and Tools employed by Metal Workers, with the Application of the Art of Electro-Metallurgy to Manufacturing Processes. By Oliver Byrne. A new revised and improved edition, with additions by John Scoffern, William Clay, William Fairbairn, and James Napier. With five hundred and ninety-two engravings. 652 pages, 8vo. Price SIX DOLLARS.

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Fig. 2

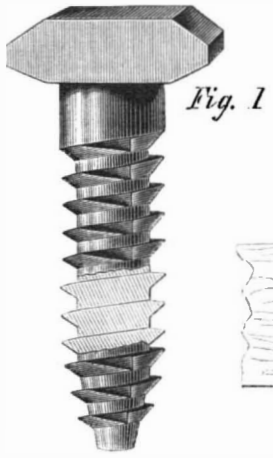
Fig. 1

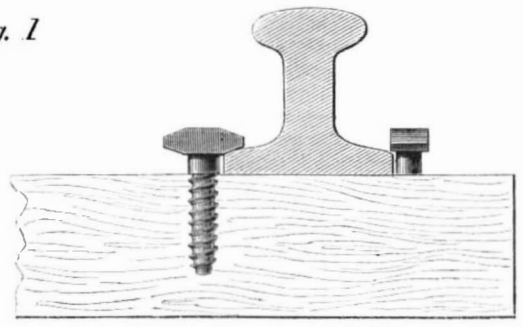
Fig. 3

MONTIGNANI'S SCREW SPIKE.

THE MONITOR "COMANCHE."—In noting the progress made in raising the sunken monitor *Comanche*, the San Francisco *Bulletin* says:—"From Mr. Ryan, one of the contractors, and under whose personal supervision the cleaning up of the material is being done, we learn that the greatest danger to be apprehended is that the ribs of the *Comanche* may be injured by breaking or bending in getting up from the *Aquilæ*. The shapes of these ribs are peculiar, scarcely more than two of each being alike, and in case many of them should be broken or bent in recovering them, it would be very difficult to detect the change so as to admit of remedy. To add to the trouble the molds from which the *Comanche* was built have been destroyed by a fire in Jersey City, so that it would be almost impossible to rebuild her, as the rivet holes would scarcely admit of coming in their right places."

AFFINITY OF IRON FOR SULPHUR.—The strong affinity of iron for sulphur is strikingly illustrated at Prof. Everett's lead-smelting works in Horatio street, New York. While the sulphide of lead is being reduced in a reverbatory furnace, the charge is stirred every fifteen minutes with a large iron hoe. The sulphur set free from the galena combines with the iron of the hoe, forming a thin stratum of sulphide of iron, which crumbles off, leaving a fresh surface of iron exposed to the action of the sulphur. This action goes on so rapidly that a hoe an inch in thickness is destroyed in the course of each day.

NAVAL HYGIENE.—Dr. Dutroleau has examined the effects of modern naval improvements in a hygienic point of view. Paddle-steamers are superior to screws as regards oscillation, but the atmosphere in screw steamers is rather better, the engine-room being apart from the rest of the vessel, and in general, owing to the short time in which passages are effected in consequence of steam, most nautical diseases have lost their virulence. As regards those endemical maladies which are peculiar to hot countries, the frequent removal of air caused by steam is found to be to a certain extent a preservative against them.

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